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LINEAR PRECIPITATION CHARACTERISTICS IN THE ATMOSPHERE.(U)

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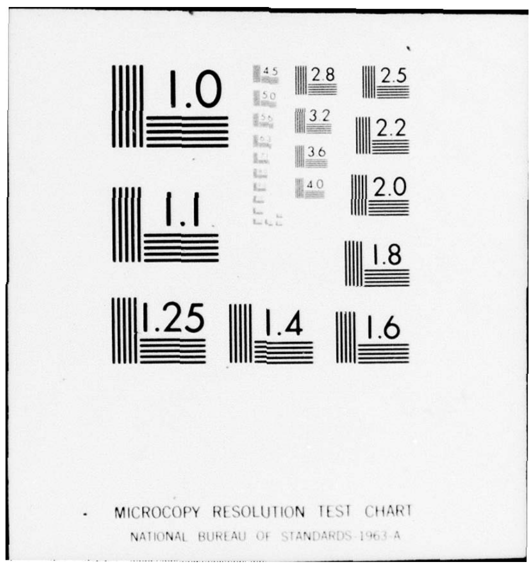
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LINEAR PRECIPITATION CHARACTERISTICS IN THE ATMOSPHERE

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and

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FINAL REPORT

Period Covered: 1 September 1973 through 31 August 1976

December 1976

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This three year study was designed primarily to investigate variations in precipitation characteristics along lines. Instrumentation utilized included a dual wavelength (3 and 10 cm) radar, recording raingages, and raindrop spectrometers, all partially operated with support from other sources.

Radar data recorded and analyzed were confined to azimuths in the immediate vicinity of the radial along which the raingages and spectrometers were located, and elevation angles from 0 deg - 4.5 deg above ground. Radar reflectivity and → next page

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cont. attenuation were measured by the radar system, with liquid water content calculated from the attenuation information. The surface raingages were utilized to obtain rainfall rates and amounts while the raindrop spectrometers yielded dropsize spectra as well as rainfall rate data.

The radar data indicated large, small-scale variations for the variables measured along the radar radials of interest for four rain periods examined. Both convective and stratiform precipitation were sampled, the convective rains having greater maxima of the variables as well as greater time and space variability for the measured parameters.

LINEAR PRECIPITATION CHARACTERISTICS IN THE ATMOSPHERE

INTRODUCTION

This AFGL sponsored contract was designed to investigate the relationship between precipitation characterisitics along ray paths in the atmosphere and those along the ground.

The observational program associated with the research utilized a dual wavelength (3 and 10 cm) radar system, raindrop spectrometers and recording raingages to provide data for defining variations in liquid water content, radar reflectivity and surface rainfall characteristics. Potential field operational periods during 1973-75 were in spring and fall in east central Illinois and in the St. Louis, Missouri region in summer. The primary goal was to collect a sufficiently large quantity of data from varying precipitation regimes to permit the definition of statistical distributions of the above parameters along radar radials in nearly instantaneous time intervals, and the development of relationships between these distributions. Data collection was often limited by the use of much of the needed equipment (radar and raingages) for other grants and contracts which had higher operational priorities.

OBSERVATIONAL AND ANALYTICAL PROGRAM

Introduction

The primary purpose for development of the dual wavelength radar was as a hail detection device, and its development was funded by a separate, joint NSF grant to the Water Survey and the University of Chicago. This radar is referred to as the CHILL radar (CH-Chicago, ILL-Illinois). Its presence in Illinois therefore was to support hail research with ground truth from a surface network of recording raingages and hail pads. As a result, the use of the radar for this AFCRL effort was contingent on the radars availability as established by the NSF grant which financially supported radar operations.

Field operations in 1974 and 1975 related to the line-oriented recording raingages and raindrop spectrometers were funded by this contract and were operated in conjunction with the radar system.

Data Acquisition Systems

Radar. Since variations in the liquid water content (LWC) are of prime interest to this AFGL study, the dual wavelength radar utilized (when available) provided an adequate instrumentation system since it can measure attenuation rate (as well as radar reflectivity); this parameter is necessary for the calculation of LWC. This radar provides information concerning the gross features of microwave attenuation and attenuation statistics.

The detection of hail and the determination of hail size was the initial impetus for the development of this dual wavelength radar system. Theoretically, hail detection is accomplished with the dual wavelength radar by measuring the average echo power returned at 10 cm and 3 cm wavelengths from matched beams illuminating volumes containing cloud and precipitation particles. The range derivative of the logarithm of the ratio of the average echo powers at the 10 cm and 3 cm wavelengths is then calculated and used as the hail identifying signal. Determination of attenuation results from the above procedure and attenuation rate may then be used to obtain LWC with the aid of an empirically determined equation relating the two parameters.

Previous methods of LWC determinations utilizing radar involved the measurement of returned power from a single wavelength radar from which the radar reflectivity factor (Z) was calculated using the radar equation; attenuation rate was then calculated from empirical relationships. Additional errors result from utilizing this method since attenuation is empirically determined.

The dual wavelength technique measures attenuation. Further details concerning LWC determination utilizing dual wavelength radar may be found in a paper by Eccles and Mueller (1971).

Since the radar system was originally designed and utilized as a tool for hail detection other federally sponsored studies, the field periods for this AFGL study were scheduled to coincide, when possible, with the availability of the radar in east central Illinois when it was not being utilized elsewhere. The funding for operation of the radar was provided by separate grants (NSF DES75-14221 and NSF GK-37859). Reliability of the system was not as high as desirable. However, it must be realized that this is not an "off the shelf" item and still had some inherent problems often associated with newly developed instrumentation. Most of the difficulties were associated with signal processing and recording of the radar information. The data set obtained in spring 1975 was more usable than that from previous periods and provided the bulk of the radar information used in analyses reported on further in this report.

Digitized radar data were recorded on magentic tape when rain was occurrring within the surface instrumentation network. In addition to tape recording the radar information, a remote PPI scope(plan-position indicator) was photographed at approximately 1-minute intervals as a backup and as a check for the tape recording system. The radar antenna scanning was programmed to accomodate the hail detection work as a first priority. Antenna elevation angle generally was incremented by approximately 1^{o} at the end of each 360^{o} sweep to a maximum elevation determined by the echo tops and the distance between the radar and the echoes of interest. Time between sweeps for a given elevation angle was variable as a result of the above antenna programming

mode. However, this time interval generally did not exceed 5 minutes. Data collection continued until the precipitation left the network.

Raindrop Spectrometers. Six raindrop spectrometers were utilized in the data collection phase to obtain raindrop size distributions at the surface associated with the rains of interest. This instrument was designed and developed at the Water Survey (with ERDA funding) over the past five years with a number of modifications being made during this time. The raindrop spectrometer is a device which senses the momentum of raindrops, assumed to be falling at terminal velocity at ground level, and converts these signals to digits which are proportional to drop size. A transducer in the system transforms the mechanical impulse generated by a drop striking the sensor head to an electronic signal which is then digitized and recorded on magnetic cassette tape for further processing. Instrument reliability has slowly improved, however, as was indicated in previous quarterly reports, operational difficulties were encountered during the data collection periods of this contract. As a result, the amount of usable information is small.

Since two of the parameters calculated from drop spectra are radar reflectivity factor (Z) and liquid water content, these values measured at the ground may be compared to the above ground, radar measured Z and the LWC calculated from the radar measured attenuation. Rainfall rate is also calculated from the drop spectra, usually over 60 second intervals.

Recording Raingages. Six weighing bucket type recording raingages were used in addition to the raindrop spectrometers to yield rainfall rates and amounts at the surface. Operation of the gages in Illinois was funded by this contract. The clock mechanism in each was geared so that rates could be measured to 1-minute time intervals. The gage also was fitted with

a 32 cm diameter top as opposed to the standard 20 cm top to improve amount resolution. The accuracy of these short-time rate measurements is limited by the mechanical and hydraulic response limitations of the instrument as well as by the human error involved in digitizing the raingage chart information. The gage information is recorded on a 29 cm long chart with a clock cylinder geared to rotate once each 6 hours. On these charts, 1 minute is equivalent to 0.8 mm along the horizontal dimension and 2.5 mm vertically is equivalent to 1.0 mm of precipitation. These resolution problems do not exist with the rates determined from raindrop spectra.

Field Operations

The spring and fall field operational periods (Spring 1974 and 1975, Fall 1973 and 1974) typically consisted of 8-10 weeks of activity involving personnel associated with the radar-hail detection program as well as those connected with this effort. Two individuals were scheduled for duty on each day during the period and were responsible for examining the weather information as provided by a weather facsimile machine and civilian-airways circuit teletype printer. The synoptic conditions were monitored throughout the day so that potential precipitation situations would be recognized and necessary preparations made regarding support personnel and equipment. When precipitation over the raingage-hailpad-spectrometer network was imminent, the radar was activated. The spectrometers and gages were operational at all times and were routinely visited by field technicians at intervals which assured sufficient servicing for the desired time resolution, and also insured that "missed" precipitation occurrences were kept to a minimum. These sites were serviced as soon after a rain as possible.

Data Collection Procedure and Format

The instrumentation network for this project in east central Illinois was activated in conjunction with one designed to test the dual wavelength radar system as a tool for hail detection. The network shown in Figure 1 depicts the locations of the six raindrop spectrometers and located raingages with respect to the radar and to the surface hail network. The closest spectrometer-raingage site to the radar was approximately 35 Km with the farthest one being approximately 58 Km.

There were four data collection periods related to this 3-year effort with two occurring in spring and two during fall. The most recent one in Spring 1975 was utilized exclusively for the data analysis phase since data quality and quantity were significantly better than in previous periods. The data from four rain events during the Spring 75 period will be presented. Operational problems with the radar and spectrometers greatly limited the value of the 1973 and 1974, and portions of the 1975 data.

Radar data were recorded on magnetic tape with Z and A (attenuation) values measured for each 150 m-length range bin along radials of interest emanating from the radar location. Data were recorded for radials (azimuths) 270°, 271° and 272° (see Fig. 1), the raingages and sepctrometers being along the 271° radial. These recorded data included 0.5°, 1.5°, 2.5°, 3.5° and 4° elevation angles along each radial; height of the radar beam above ground of these elevation angles as a function of range is shown in Figure 2. These elevations allow the determination of LWC for heights up to the freezing level. Averaging of Z and A values was performed over two and three consecutive range bin intervals along the radials in order to obtain representative

samples. The LWC values were obtained from attenuation rate through the empirical equation:

$$M = 2.23A^{0.787} \qquad \text{(Eccles and Mueller, 1971)}$$

where M is LWC in g/m^3 and A is attenuation rate in db/Km. This equation was derived from LWC and A values calculated from approximately 400 independent cubic meter samples of raindrop data obtained with a photographic technique.

There are limitations to the use of this expression which are important to note. Erroneously high LWC values may result when this expression is used for radar volumes which contain solid (ice) precipitation particles. Therefore, caution should be used when interpreting LWC data from convective systems that may contain hail or when the radar beam is above the freezing level. However, in the absence of solid precipitation, a good estimate of LWC may be made, particularly below cloud base in a rain-only environment as well as in-cloud in the presence of cloud droplets and rain.

It is of value to know what can be expected as an upper limit to LWC in clouds and precipitation in order to have an empirical reference with which to compare data obtained using the above scheme. Roys and Kessler (1966) indicated a value of approximately 43 g/m^3 as a maximum in-cloud measurement of LWC during cloud penetrations into thunderstorms with an F-100F aircraft. Surface values of LWC calculated from raindrop spectra obtained with a photographic technique approach a maximum of approximately 29 g/m^3 for spectra recorded with the raindrop camera.

Surface rainfall rates and amounts were obtained from weighing bucket type recording raingages; these gages are the type used widely by the National

Weather Service. Rate-time resolution may be varied by changing the gear ratio controlling the rotation speed of the chart on which the information is recorded. This permits a maximum resolution of 1-minute for rate determinations when the proper gear ratio is utilized. However, as indicated previously, the accuracy of these short-time rates with this raingage system is affected by design and human error factors which permit significantly more error than 1-minute rates determined from raindrop spectra. As may be seen in Figure 1, six recording raingages, each spaced approximately 5 km apart along the 271° radial from the radar, were utilized for this study.

The raingage charts pertaining to the periods of interest were digitized with an Autotrol chart reader. A computer program was later used to convert these digitized values to 1-minute rainfall rates and amounts. This information is then related to the corresponding radar data.

Raindrop data were recorded on cassette tape for subsequent data reduction by computer. In addition to recording raindrop signals on tape, date and time were also recorded from a built-in electronic clock; this allows "rain time" to be determined. The system tape recorder is activated during rain only although the clock runs continuously. Considerable difficulty was encountered with spectrometer operations during the data collection periods. Operations in the Spring 1975 period yielded the most usable drop spectra data.

Data Reduction and Analysis

There were four rain periods during Spring 1975 from which adequate radar and raingage information were obtained. Spectrometer data collected during this time were sporadic due to a number of instrument malfunctions. A description of each period follows.

18 April. Approximately 35 minutes of radar data were collected as light precipitation associated with an approaching cold front intersected the 271^{o} radial. Rain amounts recorded by the surface raingages during this time were light with measurable precipitation at 3 of the 6 gages (0.8, 0.5 and 0.5 mm). There were no indications that this rain was associated with thundershowers although a previous rain occurring approximately 2 hours earlier did contain thundershowers. The freezing level just prior to the rain was at 3.3 Km. From Figure 2, elevation angles $> 2^{o}$ would contain radar volumes above the freezing level in the western portion of the network.

23 April. Light precipitation associated with an approaching, slow moving cold front occurred over the raingage-spectrometer network during the forenoon. The rain amounts were fairly uniform across the line with all gages receiving rain amounts between 3.0 and 4.6 mm. There were no indications than any of the precipitation over the line was convective in nature. The freezing level prior to the rain was at approximately 3.7 Km. One-minute rainfall rates did not exceed 14 mm/hr along the line with average rates between 5-8 mm/hr.

30 April. Radar data were recorded during a 65 minute period on this day. The rainfall, associated with an active cold front, was convective in nature with thundershowers, and all gages along the radial recorded precipitation. Rain amounts varied from 11.9 mm at one end of the raidal decreasing to 2.0 mm at the other. Several 1-minute rates exceeded 50 mm/hr with a maximum rate during the period of 159 mm/hr. The freezing level during precipitation was approximately 2.9 Km. For a more detailed analysis of this case see Appendix D.

30 May. Approximately 85 minutes of radar data were recorded during this strongly convective situation associated with a rapidly moving cold front. Rain amounts along the 271° radial ranged from 7.6 mm to 11.4 mm during the above period with 1-minute rates as high as 60 mm/hr observed. Hail also was recorded at the ground at 3 of the 6 raingage-spectrometer sites during the rain although the number density of stones was small. The freezing level prior to the rain was at approximately 3.7 km.

Average values for LWC and Z are presented in Appendix A for 18 April, 23 April, 30 April and 30 May 1975. The data shown are for all radar radials from 270° to 272° for elevation angles 0.5° to 4.5°; 2 and 3-bin moving averages are both shown. Average values for R as determined from the six raingages located along the 271° azimuth, are shown in Appendix B for times concurrent with the radar data. Average raindrop spectra when available are presented in Appendix C for the above periods.

The Z, A, and LWC values along the radials of interest were averaged over 2 and 3-bin intervals as a moving average along each radial. Each value then represented a radar volume 300 or 450 m in length by 1° in beam width. The number of bins to be averaged for a representative sample was not entirely clear initially. When 2 and 3-bin radar-determined LWC values are compared for the two convective days, (Fig. 3), average maximum values are greater for the 2-bin data. The 2-bin data also show more variance in the average maxima. However, examination of Z shows no observable difference in the 2 and 3-bin results.

The significant difference in the 2 and 3-bin LWC averages results using a slightly different data set for each determination. A greater number of bin averages are discarded for the 3-bin averaging than 2-bin averaging because bins containing undefined reflectivity values are not used in the LWC calculations. Since 2-bin averaging yields better space resolution, this approach is considered more desireable.

Another aspect of LWC variations may be examined with the 1-minute rainfall rate data obtained with the recording raingages. An excellent correlation exists between rainfall rate and liquid water content calculated from surface determined raindrop spectra of one minute durations. Mueller and Sims (1964) found that LWC and 1-minute rainfall rate are highly correlated when these values are calculated from raindrop distributions obtained from a photographic device (Mueller and Sims, 1966). The relationship between these variables was determined for several locations around the world, and the relationship changed insignificantly from location to location. When this relationship is determined from 1-minute spectra obtained with the raindrop spectrometer, it too is not significantly different. The expression relating LWC and R is:

$$LWC = .042\ R \qquad (1)$$

with a standard error of estimate (SE) on LWC generally <0.1; a plot of LWC versus R for data obtained with the raindrop camera and drop spectrometer is shown in Figure 4.

When the expressions used to calculate LWC and R are examined, it may be seen that the terminal velocity of the raindrops in a drop distribution is the only variable that is not common to both expressions.

Rainfall rate as calculated from spectrometer data is given by

$$R(mm/hr) = K \sum_{D=0.1}^{D=6.0} \frac{\pi}{6} D^3 N_D$$

where K is a constant which depends on the sensor area and sample time, and

$$LWC\ (g/m^3) = \sum_{D=0.1}^{D=6.0} \frac{\frac{\pi D^3 N_D}{6}}{\nu_{TD}}$$

where ν_{TD} is the terminal velocity of drop size D.

Therefore, the variability between spectra and the associated terminal velocities is responsible for the variance in the LWC, R relationships. However, since the median terminal velocity from spectra to spectra varies little, the SE is small. As a result, LWC values between cloud base and ground can be estimated with reasonable accuracy by use of surface determined rainfall rate in equation (1).

This approach can also serve as a check for LWC values obtained with the dual wavelength technique since rainfall rate was recorded at the six locations indicated in Figure 1. It must be realized that a comparison of this type necessitates averaging a number of values in space and time, since radar parameters pertaining to a volume are compared to surface, point measurements of rainfall rate. A plot of LWC as calculated form 1-minute raindrop spectra, radar-determined LWC and LWC calculated from equation (1) using the 1-minute raingage determined rainfall rates, is shown in Figure 5a. These data relate to information pertaining to raingage location 67 (Fig. 1) for the 30 April 1975 rain period. Values of radar-determined LWC are generally higher than corresponding surface values for this data set. This also occurred at location 65 shown in Figure 5b although there is a wide discrepancy during a portion of the rain between rainfall rate (and resulting LWC) from the raingage versus the spectrometer. An electronic saturation problem in this spectrometer did not allow the recording of rain rates exceeding approximately 60 mm/hr. Average raindrop spectra for the above rain periods are shown in Figure 6. The LWC discrepancy between radar and surface-determined LWC likely resulted from the large difference in sampling volume as well as the difficulty in associating, in time and space, a radar volume aloft with point measurements on the ground. The obvious advantage to radar-measured LWC as is also the case with rainfall estimated from radar is the large areal coverage with radar as opposed to point measurements obtained from surface instrumentation.

SUMMARY

Liquid water content measurements obtained from dual wavelength radar data indicate that the averaging technique used is important to the manner in which the data are interpreted. In a study such as this, aimed at learning what are the small scale variations in LWC and Z along lines, the limiting factor becomes the smallest volume size which can be examined for the variables of interest. Both 2-bin and 3-bin averaging of the radar-determined average maximum LWC are presented in the appendices for the four rainfall events sampled. Regarding the more appropriate averaging technique for Z, there is no significant difference in the average 2-bin and 3-bin maxima or standard deviation for the rain periods analyzed. This indicates that the smaller total volume (2-bin averaging) is probably large enough for obtaining representative values of Z.

A technique for estimating LWC from surface point rainfall rates was also presented based on raindrop distributions. Since wide variations exist in short interval rainfall rates and drop spectra, the resulting LWC values also show this tendency.

Examination of the data sets reveals that, as expected, there are wide fluctuations in LWC and Z as a function of range along lines (radar radials). These variations are not as extensive for more stratiform rains as the 18 April and 23 April cases which had no apparent convective elements. Average maxima as well as variance increase for LWC and Z as the precipitation becomes more convective in nature.

Although hail was observed on the ground during the 30 May rain, the LWC values are in line with the 30 April convective rain when no hail was recorded. Apparently, the number of hailstones per unit volume was sufficiently

small to be "averaged out" in the statistics. It is also possible that the hailfall was of a very short duration and was not occurring during the recorded radar sweeps. Since there was no time information concerning the hail data, this cannot be verified.

The major goal of this study was to obtain a large data sample of radar and surface rainfall information. It is apparent from the limited amount of data reported on herein that this goal was not fully realized. A major limitation arose from the limited amount of funding allotted for the effort, inadequate to support extensive radar operations. Radar data collection was possible only when the dual wavelength radar system was operating in east central Illinois as dictated by funding for a separate project. There was no AFGL funding allocated specifically for radar operations; therefore, operational priorities were weighted towards the NSF-funded radar effort. The AFGL radar effort was in essence "piggy-backed" onto the other project. In addition, poor quality of much of the radar data obtained was a contributing factor to the very limited data bank. Difficulties also with raindrop spectrometer operations contributed to the poor quality and quantity of surface drop spectra information.

Obviously, firm conclusions cannot be drawn from the small amount of data collected and analyzed. In the event information of this nature is required in the future, a similar effort would be more successful if funds for radar operations were provided.

Many of the operational difficulties encountered with the dual wavelength radar and the raindrop spectrometers resulted from problems often associated with newly developed instrumentation. Most of these have been corrected.

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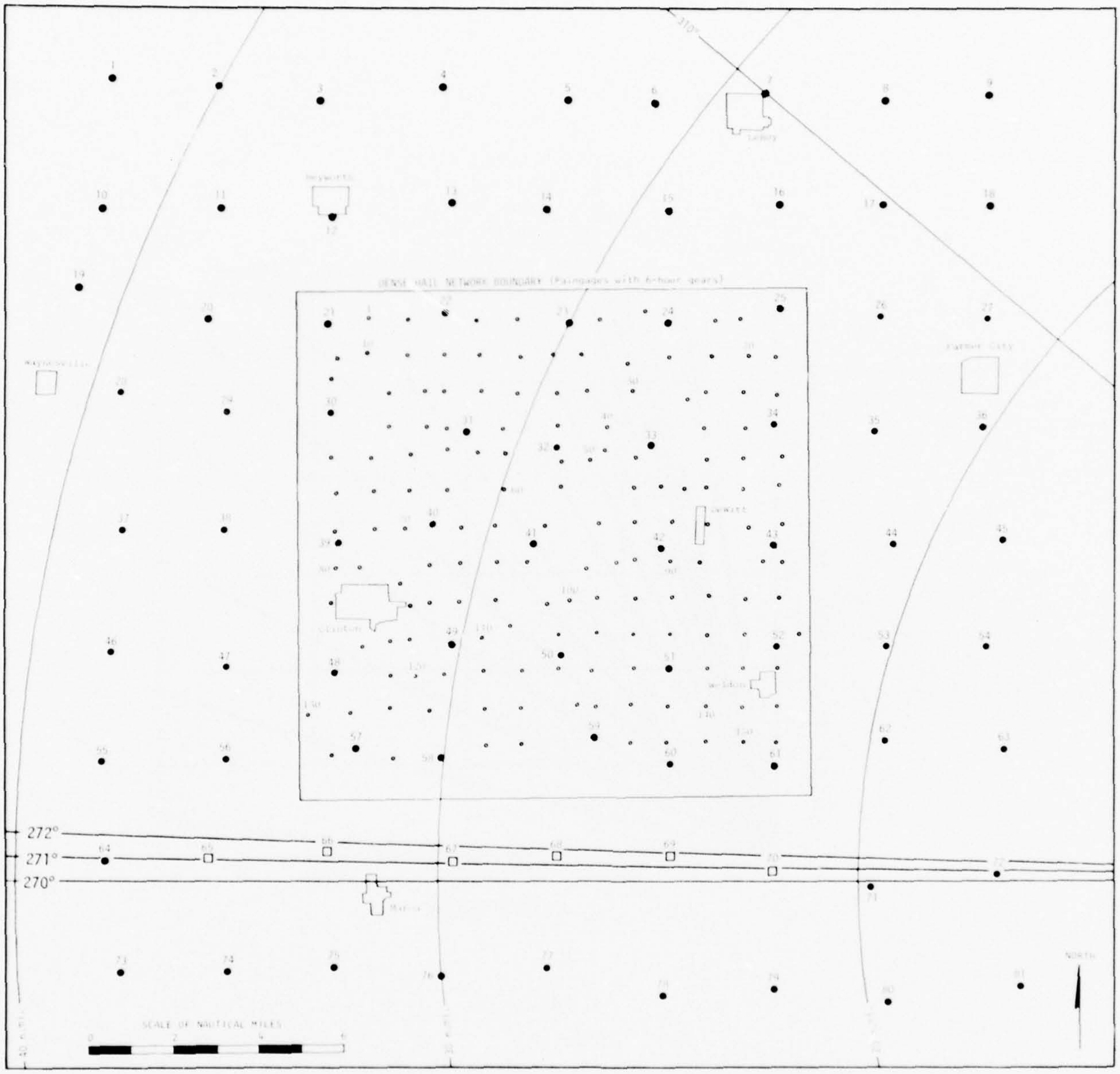

● Recording Raingages
∘ Hail Pad
□ Spectrometer-Raingage Site

Figure 1. Surface Instrumentation Network in East Central Illinois.

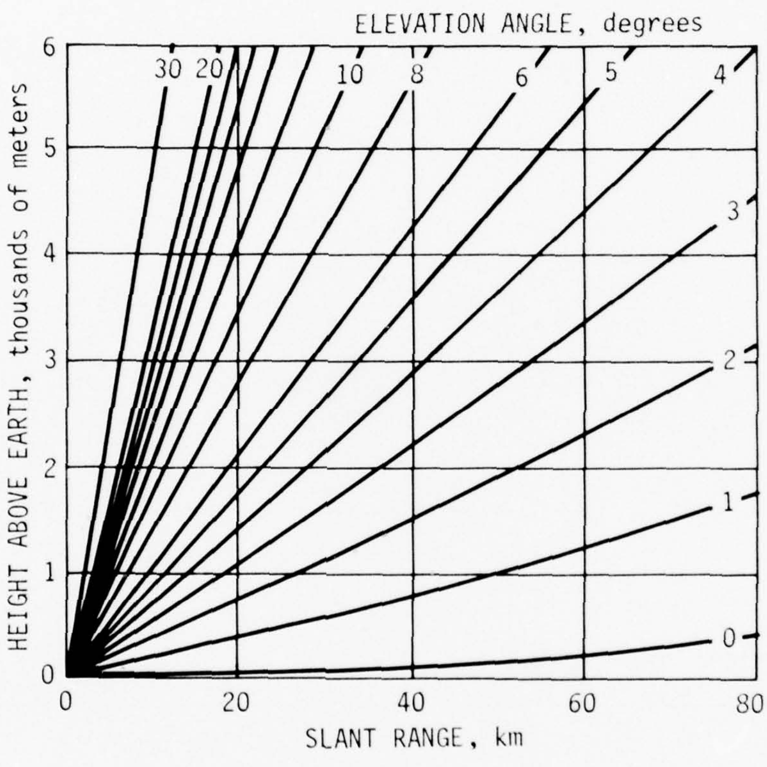

Figure 2. Height of radar beam as a function of range.

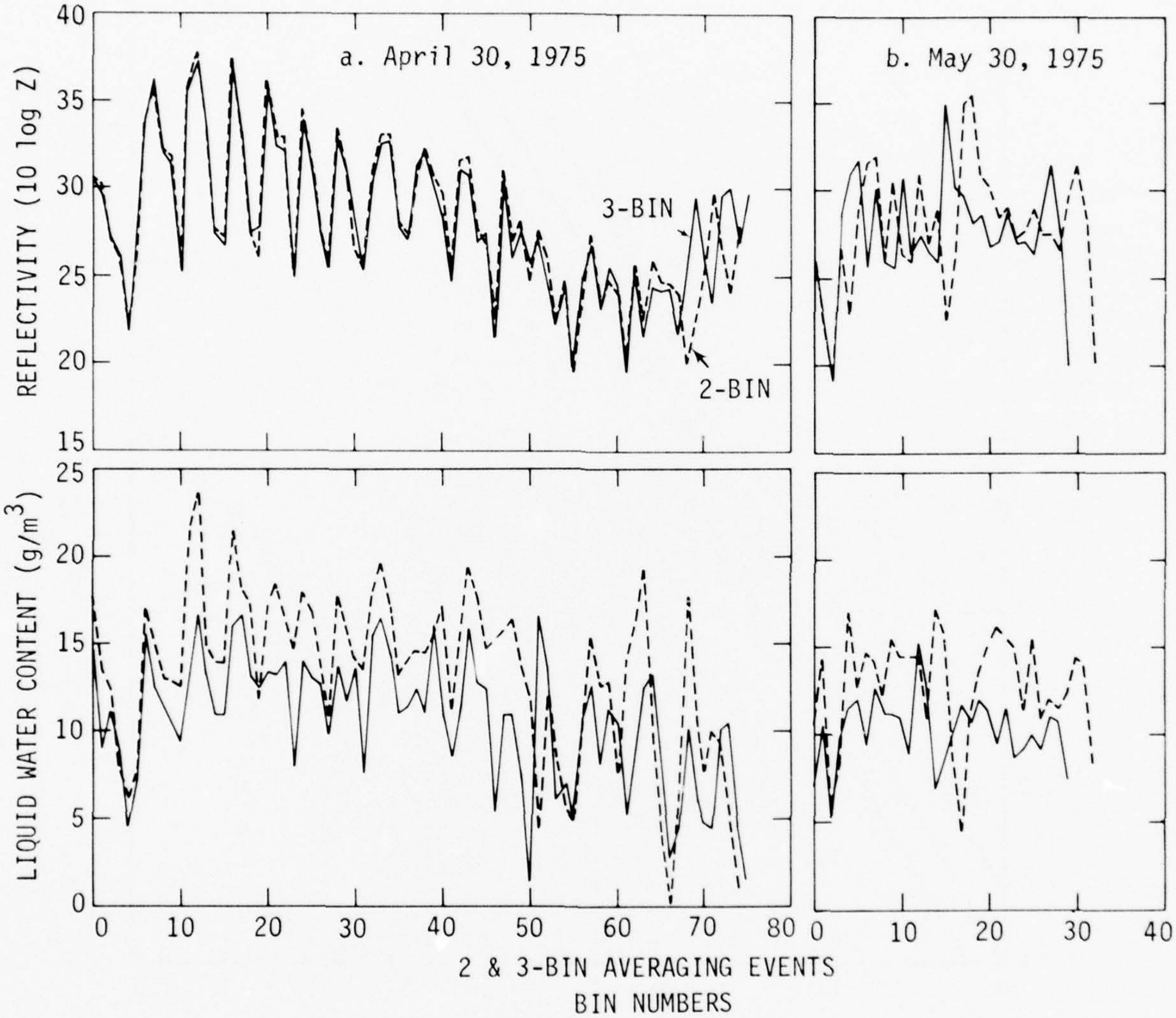

Figure 3. Comparison of 2 and 3-bin data for convective rainfall.

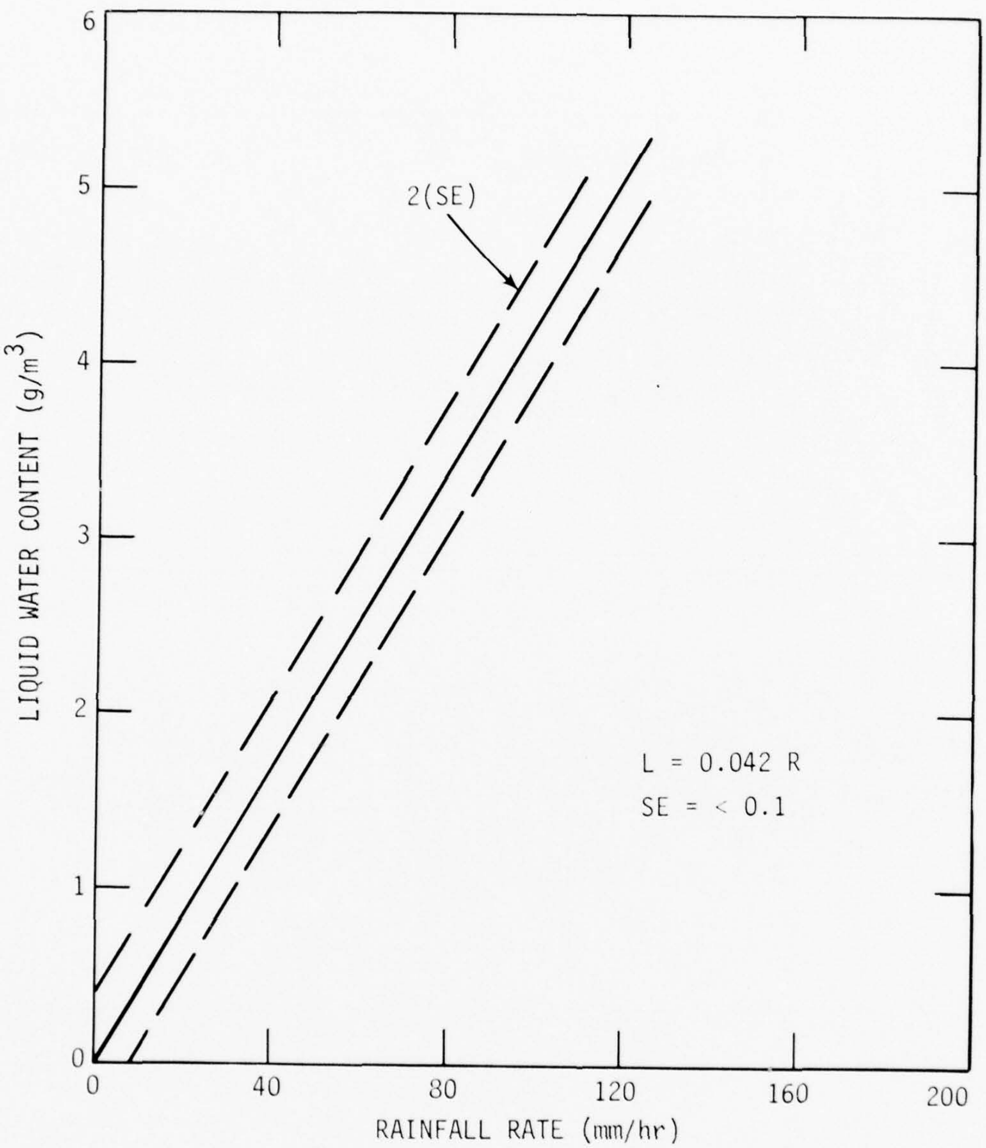

Figure 4. Liquid water content vs. rainfall rate as determined from raindrop spectra.

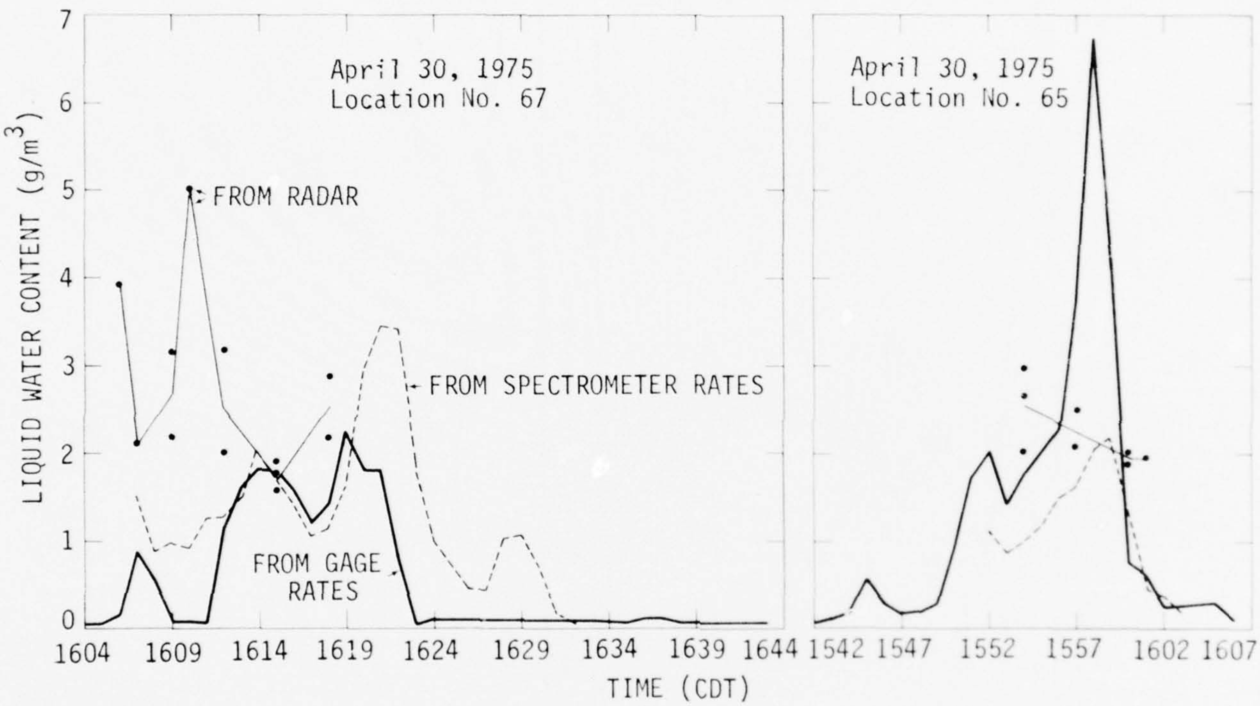

Figure 5. Liquid water content determined from radar, raingage and spectrometer data

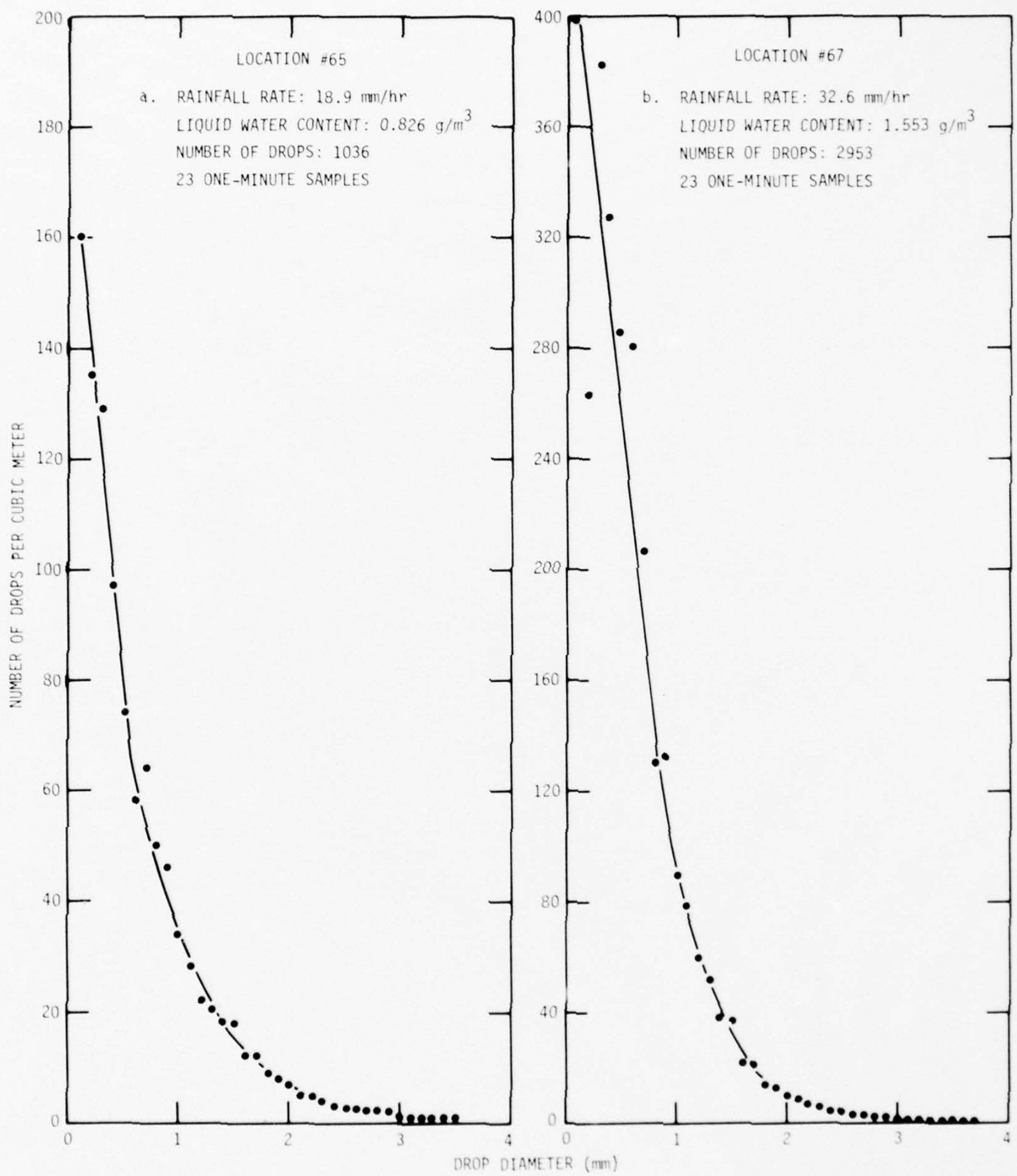

Figure 6. Average raindrop spectra for 30 April 1975.

Scientists and Engineers who have Contributed to Contract Research

Robert Cataneo

Bruce Komadina

Arthur L. Sims

Richard G. Semonin

Stanley A. Changnon

Eugene A. Mueller

Griffith Morgan

Previous and Related Contracts

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AFCRL F19628-72-C-0052

NSF DES75-14221

NSF GK-37859

Appendix A

2-BIN 4/18/75				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/18/75	10:37:20	270.2	3.4	21.7	2.50	2.28	0.0	24.3	11	7.2	1.88	1.76	4.5	8.8	3
4/18/75	10:37:20	270.7	3.4	20.5	2.33	1.93	0.0	24.5	21	8.5	5.20	4.18	0.8	17.6	8
4/18/75	10:37:26	271.3	3.4	20.1	2.07	1.80	0.0	23.8	[illegible]	7.1	5.23	4.54	0.4	17.0	15
4/18/75	10:37:26	271.8	3.4	20.1	1.56	1.19	0.0	23.3	[illegible]	5.4	3.92	3.20	1.3	15.0	11
4/18/75	10:37:26	271.8	4.4	18.3	1.12	0.94	0.0	19.8	[illegible]	1.7	1.20	1.20	0.5	2.9	2
4/18/75	10:37:26	271.0	4.4	19.6	1.23	1.03	0.0	21.1	3	5.7	2.98	2.58	1.4	10.0	5
4/18/75	10:37:26	270.5	4.4	18.2	1.35	1.16	0.0	19.8	5	1.9	0.0	0.0	1.9	1.9	1
4/18/75	10:40:22	272.0	4.4	19.7	0.90	0.84	0.0	20.6	6	3.4	1.45	1.27	1.8	5.3	3
4/18/75	10:40:22	271.6	4.5	17.8	0.62	0.47	0.0	18.6	7	5.2	3.22	2.95	2.1	9.7	3
4/18/75	10:40:22	270.6	4.4	18.8	1.23	0.99	0.0	20.3	14	7.7	3.89	3.49	2.4	13.7	6
4/18/75	10:42:51	270.2	4.4	19.9	1.14	0.94	0.0	20.9	9	1.9	0.0	0.0	1.9	1.9	1
4/18/75	10:49: 1	271.7	0.0	21.0	2.01	1.66	0.0	24.	21	6.2	6.09	5.39	0.3	18.3	6
4/18/75	10:52: 3	271.4	2.8	19.5	2.02	1.63	0.0	23.	17	4.9	5.39	4.24	1.2	15.5	5
4/18/75	10:52: 3	270.9	2.8	20.3	1.81	1.43	0.0	23.	21	10.0	3.93	3.51	4.8	14.2	3
4/18/75	10:52: 3	270.4	2.9	20.7	2.40	2.02	0.0	24.3	10	14.2	0.0	0.0	14.2	14.2	1
4/18/75	10:52:14	271.1	3.4	21.8	2.39	1.80	0.0	24.2	17	9.3	5.41	4.53	3.2	18.9	5
4/18/75	10:52:14	271.5	3.4	21.7	3.32	2.98	0.0	26.1	17	6.6	4.72	4.37	1.2	13.6	5
4/18/75	10:52:14	271.9	3.4	20.8	2.26	2.11	0.0	24.2	19	9.8	6.74	5.74	4.0	21.3	4
4/18/75	10:52:14	271.9	4.5	21.3	1.42	1.23	0.0	23.5	15	8.3	3.09	2.70	4.2	12.3	6
4/18/75	10:52:14	271.5	4.5	19.8	1.67	1.35	0.0	21.6	19	8.6	4.31	3.66	3.2	15.3	7
4/18/75	10:54: 3	271.1	4.4	21.8	1.44	1.23	0.0	24.3	10	11.5	4.32	3.90	7.0	17.3	3
4/18/75	10:54: 3	270.5	4.4	21.4	1.93	1.50	0.0	24.3	14	9.1	1.79	1.54	6.8	11.2	3
4/18/75	10:54: 3	270.0	4.5	20.6	1.87	1.57	0.0	23.2	17	6.3	6.21	5.71	1.0	16.8	6
4/18/75	10:55:12	270.5	2.7	20.5	2.63	2.15	0.0	22.8	6	17.5	3.70	3.70	13.8	21.2	2
4/18/75	10:55:12	270.0	2.7	19.4	1.23	0.93	0.0	20.6	7	11.9	1.25	1.25	10.6	13.1	2
4/18/75	10:55:19	271.8	4.5	20.3	1.73	1.42	0.0	23.8	16	6.4	4.53	3.49	1.8	16.1	7
4/18/75	10:55:19	271.3	4.5	19.9	1.81	1.53	0.0	21.8	15	6.9	4.19	3.31	0.3	13.7	7
4/18/75	10:57:59	270.4	4.5	19.0	1.23	1.03	0.0	21.3	10	6.6	3.57	2.88	2.6	12.3	4
4/18/75	10:58:17	270.0	3.2	20.1	1.66	1.20	0.0	21.6	8	8.3	0.47	0.47	7.9	8.8	2
4/18/75	11: 7:11	270.5	2.9	16.9	0.22	0.20	0.0	16.8	2	2.9	0.0	0.0	2.9	2.9	1
4/18/75	11: 7:11	271.8	3.9	19.7	1.22	1.02	0.0	20.8	4	9.2	0.0	0.0	9.2	9.2	1
4/18/75	11: 9:14	270.0	4.5	17.0	0.27	0.20	0.0	17.0	2	3.3	0.0	0.0	3.3	3.3	1
4/18/75	11:12: 3	270.1	4.5	18.5	0.91	0.72	0.0	19.4	5	4.7	1.21	1.21	3.5	5.9	2

3-BIN 4/18/75				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/18/75	10:37:20	270.2	3.4	22.1	2.06	1.79	0.0	24.3	9	4.7	0.0	0.0	4.7	4.7	1
4/18/75	10:37:20	270.7	3.4	20.8	2.16	1.82	0.0	23.9	17	5.8	3.07	2.46	2.8	11.4	5
4/18/75	10:37:26	271.3	3.4	20.3	1.81	1.49	0.0	23.6	27	6.9	2.32	1.37	3.5	10.5	7
4/18/75	10:37:26	271.8	3.4	20.4	1.34	1.07	0.0	22.7	22	3.9	2.07	1.65	1.0	7.8	7
4/18/75	10:37:26	271.0	4.4	19.5	0.87	0.63	0.0	20.6	10	2.0	2.51	2.14	0.2	6.3	4
4/18/75	10:40:22	270.6	4.4	18.9	0.55	0.49	0.0	19.8	10	2.3	1.62	1.50	0.4	4.6	4
4/18/75	10:49: 1	271.7	0.0	21.0	1.50	1.21	0.0	22.6	13	7.7	2.25	2.09	4.6	9.7	3
4/18/75	10:52: 3	271.4	2.8	19.4	1.59	1.22	0.0	22.3	11	4.5	4.17	4.17	0.4	8.7	2
4/18/75	10:52: 3	270.9	2.8	20.4	1.59	1.34	0.0	22.3	10	4.3	1.67	1.67	2.7	6.0	2
4/18/75	10:52: 3	270.4	2.9	20.4	1.26	0.90	0.0	21.6	4	8.7	0.0	0.0	8.7	8.7	1
4/18/75	10:52:14	271.1	3.4	21.7	2.26	1.58	0.0	23.4	11	11.7	0.0	0.0	11.7	11.7	1
4/18/75	10:52:14	271.5	3.4	22.0	3.22	2.69	0.0	25.7	10	6.1	5.15	5.15	0.9	11.2	2
4/18/75	10:52:14	271.9	3.4	21.2	1.85	1.70	0.0	23.6	10	6.0	5.53	5.42	0.1	13.0	4
4/18/75	10:52:14	271.9	4.5	20.9	0.81	0.73	0.0	21.9	10	6.1	3.11	3.95	0.6	10.2	4
4/18/75	10:52:14	271.5	4.5	20.1	0.92	0.67	0.0	21.0	14	5.6	1.63	1.23	3.9	8.7	5
4/18/75	10:54: 3	271.1	4.4	21.7	1.02	0.96	0.0	23.3	6	8.1	0.63	0.63	7.5	8.7	2
4/18/75	10:54: 3	270.5	4.4	21.0	1.42	1.12	0.0	23.3	10	6.5	2.47	2.47	4.0	8.9	2
4/18/75	10:54: 3	270.0	4.5	20.5	1.59	1.33	0.0	22.6	12	7.6	1.52	1.52	6.1	9.1	2
4/18/75	10:55:12	270.5	2.7	20.5	0.91	0.73	0.0	21.5	4	7.0	1.67	1.67	5.3	8.6	2
4/18/75	10:55:12	270.0	2.7	19.3	0.56	0.51	0.0	19.8	6	3.8	2.14	1.99	1.9	6.8	3
4/18/75	10:55:19	271.8	4.5	20.4	1.47	1.24	0.0	23.1	12	8.3	3.42	2.73	2.8	12.2	4
4/18/75	10:55:19	271.3	4.5	20.0	1.43	1.09	0.0	22.5	13	4.4	1.99	1.62	2.3	7.7	4
4/18/75	10:57:59	270.4	4.5	19.0	1.08	0.97	0.0	20.6	7	2.1	0.0	0.0	2.1	2.1	1
4/18/75	10:58:17	270.0	3.2	20.7	0.69	0.61	0.0	21.2	5	5.1	2.03	1.89	3.3	7.9	3

2-BIN 4/23/75

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/23/75	11:18:16	271.0	3.4	22.1	0.75	0.67	0.0	22.6	5	9.6	0.0	0.0	9.6	9.6	1
4/23/75	11:18:15	271.3	3.4	22.0	1.46	1.22	0.0	23.7	7	7.4	5.79	5.42	2.4	15.5	3
4/23/75	11:21:12	270.0	3.4	20.8	0.88	0.69	0.0	21.5	4	3.2	0.0	0.0	3.2	3.2	1
4/23/75	11:24:11	270.0	3.5	21.7	1.09	0.91	0.0	23.2	6	4.0	2.59	2.59	1.4	6.5	2
4/23/75	11:24:15	270.7	3.5	23.9	1.98	1.65	0.0	25.8	9	11.2	7.40	6.78	3.9	21.3	3
4/23/75	11:24:16	271.9	3.5	22.1	1.24	1.06	0.0	23.2	4	3.5	0.0	0.0	3.5	3.5	1
4/23/75	11:30:37	270.0	3.5	22.8	1.44	1.19	0.0	24.6	15	7.2	3.97	3.36	0.5	13.2	7
4/23/75	11:30:37	270.3	3.5	22.1	1.45	1.04	0.0	23.9	12	6.3	4.62	3.62	2.0	15.0	5
4/23/75	11:30:37	270.6	3.5	23.2	1.68	1.38	0.0	25.8	12	3.4	2.53	2.20	0.6	7.3	4
4/23/75	11:30:37	271.0	3.5	23.5	1.53	1.30	0.0	25.7	9	10.5	4.11	3.32	3.8	15.2	4
4/23/75	11:30:43	271.4	3.5	23.9	1.35	1.10	0.0	25.8	12	6.5	1.68	1.50	4.8	9.0	8
4/23/75	11:33:10	271.4	3.5	24.8	3.04	2.40	0.0	28.7	18	6.3	3.35	2.63	0.7	11.8	8
4/23/75	11:33:10	271.1	3.5	24.9	2.29	1.77	0.0	27.1	21	5.6	3.75	3.00	2.0	13.9	8
4/23/75	11:33:10	270.6	3.5	26.0	4.08	3.27	0.0	29.8	23	4.9	2.51	2.32	1.5	7.9	8
4/23/75	11:33:10	270.3	3.5	25.3	3.64	3.11	0.0	30.4	30	6.2	3.65	3.00	0.2	13.0	10
4/23/75	11:33:16	270.0	3.5	26.0	2.36	1.97	0.0	29.7	34	7.9	5.49	4.57	1.5	22.1	17
4/23/75	11:36:14	271.4	3.4	23.8	1.90	1.53	0.0	26.2	43	6.2	5.71	4.52	0.2	19.1	17
4/23/75	11:36:14	271.1	3.4	24.1	2.01	1.55	0.0	27.1	46	5.6	3.78	3.18	0.6	15.8	25
4/23/75	11:36:14	270.7	3.5	24.3	1.86	1.44	0.0	28.3	49	7.1	4.23	3.54	0.8	15.7	22
4/23/75	11:36:20	270.4	3.4	23.2	1.77	1.37	0.0	25.7	42	7.0	4.65	3.96	0.9	16.2	16
4/23/75	11:36:20	270.0	3.4	22.9	2.03	1.61	0.0	26.2	40	6.5	3.47	2.85	0.6	14.2	16
4/23/75	11:36:23	271.8	4.4	19.2	0.69	0.66	0.0	19.6	2	12.4	0.0	0.0	12.4	12.4	1
4/23/75	11:39:18	271.8	3.4	24.4	1.74	1.19	0.0	27.0	26	9.4	6.52	5.33	0.3	23.8	10
4/23/75	11:39:18	271.5	3.4	24.5	1.43	1.16	0.0	26.5	24	9.8	3.13	2.53	4.9	15.2	10
4/23/75	11:39:18	271.1	3.4	24.4	2.44	1.92	0.0	27.8	21	11.4	6.69	5.88	0.7	21.3	8
4/23/75	11:39:18	270.8	3.4	24.2	1.90	1.45	0.0	28.4	30	7.7	4.84	4.05	0.2	16.0	12
4/23/75	11:39:18	270.4	3.4	24.7	1.53	1.28	0.0	27.0	32	7.2	3.54	2.37	0.9	11.9	11
4/23/75	11:39:24	270.0	4.4	27.8	1.10	1.00	0.0	29.5	8	12.9	0.48	0.48	12.4	13.4	2
4/23/75	11:42:23	270.1	3.4	20.1	0.59	0.46	0.0	20.8	8	8.8	1.69	1.59	7.1	10.5	2
4/23/75	11:42:29	270.4	4.4	20.2	0.53	0.52	0.0	20.9	3	1.0	0.0	0.0	1.0	1.0	1
4/23/75	11:42:29	270.7	4.4	20.0	1.37	1.32	0.0	21.7	6	9.2	3.33	3.18	4.4	11.7	3
4/23/75	11:45:13	270.7	0.4	22.7	1.89	1.55	0.0	27.5	26	5.6	2.92	2.41	0.7	11.3	14
4/23/75	11:45:13	271.1	0.4	23.1	2.47	2.03	0.0	29.0	32	6.4	2.81	2.41	1.2	9.6	13
4/23/75	11:45:48	271.9	4.4	21.3	0.94	0.79	0.0	23.0	29	4.5	3.42	3.18	0.1	9.3	10

3-BIN 4/23/75

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/23/75	11:18:16	271.0	3.4	22.2	0.12	0.09	0.0	22.2	2	0.2	0.0	0.0	0.2	0.2	1
4/23/75	11:18:16	271.3	3.4	22.3	0.36	0.34	0.0	22.7	5	0.8	0.0	0.0	0.8	0.8	1
4/23/75	11:24:11	270.0	3.5	21.3	0.78	0.74	0.0	22.2	3	3.3	0.0	0.0	3.3	3.3	1
4/23/75	11:24:16	270.7	3.5	23.9	1.55	1.11	0.0	25.3	8	8.8	5.51	4.72	2.4	15.9	3
4/23/75	11:30:37	270.0	3.5	22.9	1.07	0.94	0.0	24.3	12	4.9	2.09	1.66	1.6	8.2	7
4/23/75	11:30:37	270.3	3.5	22.1	0.77	0.62	0.0	22.7	8	4.9	3.15	3.15	1.8	8.1	2
4/23/75	11:30:37	270.6	3.5	22.6	1.10	0.85	0.0	24.3	9	3.0	0.83	0.72	1.8	4.0	4
4/23/75	11:30:37	271.0	3.5	23.8	1.11	0.94	0.0	24.9	7	9.0	0.03	0.03	9.0	9.1	2
4/23/75	11:30:43	271.4	3.5	24.1	0.81	0.74	0.0	25.5	9	4.1	2.13	1.83	1.3	6.5	3
4/23/75	11:33:10	271.4	3.5	25.4	2.70	1.98	0.0	28.1	13	5.4	2.61	2.38	1.8	8.0	6
4/23/75	11:33:10	271.1	3.5	25.4	1.12	0.93	0.0	26.7	16	6.4	3.44	2.86	0.3	10.9	6
4/23/75	11:33:10	270.6	3.5	26.7	3.65	2.79	0.0	29.6	16	7.9	0.23	0.23	7.7	8.1	2
4/23/75	11:33:10	270.3	3.5	25.5	3.54	2.94	0.0	28.9	24	5.4	2.18	1.78	2.3	9.1	6
4/23/75	11:33:16	270.0	3.5	26.3	2.05	1.58	0.0	29.1	29	6.0	3.64	3.37	1.2	12.2	15
4/23/75	11:36:14	271.4	3.4	23.9	1.52	1.33	0.0	26.0	35	6.1	3.88	3.08	0.5	15.5	14
4/23/75	11:36:14	271.1	3.4	24.1	1.70	1.41	0.0	26.5	42	5.4	2.96	2.37	0.5	10.9	19
4/23/75	11:36:14	270.7	3.5	24.4	1.49	1.15	0.0	27.8	45	6.1	2.85	2.48	1.6	12.0	13
4/23/75	11:36:20	270.4	3.4	23.3	1.51	1.11	0.0	24.8	35	4.2	2.62	2.36	0.3	7.8	12
4/23/75	11:36:20	270.0	3.4	23.2	1.74	1.39	0.0	25.8	33	4.4	3.03	2.67	0.3	10.2	12
4/23/75	11:39:18	271.8	3.4	24.6	1.12	0.84	0.0	25.4	23	4.8	2.64	2.39	0.5	8.4	11
4/23/75	11:39:18	271.5	3.4	24.5	1.23	0.94	0.0	26.4	20	4.4	2.59	2.27	0.4	8.0	12
4/23/75	11:39:18	271.1	3.4	24.5	2.27	1.69	0.0	27.5	15	6.3	3.53	3.07	1.6	11.5	8
4/23/75	11:39:18	270.8	3.4	24.4	1.82	1.42	0.0	27.7	25	6.2	5.00	4.07	1.7	18.6	11
4/23/75	11:39:18	270.4	3.4	24.8	1.34	1.12	0.0	26.7	27	5.1	1.66	1.52	2.5	7.8	11
4/23/75	11:39:24	270.0	4.4	27.9	0.72	0.67	0.0	29.0	5	7.2	0.0	0.0	7.2	7.2	1
4/23/75	11:42:29	270.1	3.4	19.8	0.38	0.37	0.0	20.3	4	4.7	1.73	1.73	3.0	6.4	2
4/23/75	11:42:29	270.7	4.4	20.2	1.02	0.94	0.0	21.0	4	11.4	0.0	0.0	11.4	11.4	1
4/23/75	11:45:13	270.7	0.4	22.7	1.61	1.40	0.0	26.5	23	4.9	2.97	2.08	1.4	12.0	12
4/23/75	11:45:13	271.1	0.4	23.5	2.40	2.07	0.0	27.9	26	4.3	2.42	1.84	0.4	9.7	11
4/23/75	11:45:48	271.9	4.4	21.3	0.75	0.57	0.0	22.3	23	2.6	2.30	1.76	0.0	7.6	7

2-BIN 4/30/75

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	15:53:31	271.9	0.4	22.8	2.96	2.43	0.0	28.3	24	6.5	4.86	3.05	1.5	21.3	13
4/30/75	15:53:31	271.6	0.4	24.3	2.65	2.14	0.0	28.8	21	8.0	3.90	3.33	2.9	16.3	10
4/30/75	15:53:31	271.3	0.4	25.8	3.07	2.31	0.0	31.5	18	11.0	4.29	3.57	3.2	17.1	9
4/30/75	15:53:31	270.9	0.4	26.8	4.94	4.07	0.0	33.2	19	8.1	5.36	4.28	1.4	17.6	11
4/30/75	15:53:31	270.5	0.4	24.7	4.61	3.79	0.0	30.8	16	6.8	4.56	3.62	1.9	16.4	9
4/30/75	15:53:35	270.2	0.4	22.9	3.20	2.83	0.0	27.2	13	8.0	3.70	3.25	3.9	12.9	3
4/30/75	15:53:35	270.2	1.4	21.6	2.26	1.84	0.0	25.2	16	5.6	3.00	2.67	1.7	10.2	5
4/30/75	15:53:35	270.6	1.4	25.5	3.77	3.27	0.0	31.1	16	10.4	5.03	4.48	3.7	18.0	5
4/30/75	15:53:35	271.1	1.4	26.3	6.05	5.48	0.0	33.4	22	8.4	3.20	2.55	4.1	14.5	9
4/30/75	15:53:35	271.6	1.4	27.8	5.23	4.36	0.0	34.1	24	6.3	3.47	3.11	2.1	12.4	10
4/30/75	15:53:39	272.0	1.4	26.7	3.61	2.79	0.0	32.0	24	12.3	3.76	3.42	6.2	17.5	10
4/30/75	15:53:39	272.0	2.5	18.6	0.88	0.71	0.0	20.0	14	4.9	3.74	3.25	0.0	11.7	7
4/30/75	15:53:39	271.7	2.5	22.7	1.74	1.36	0.0	24.3	12	4.8	3.50	3.01	2.5	10.9	4
4/30/75	15:53:39	271.3	2.5	26.7	5.33	4.41	0.0	30.7	10	6.9	4.02	2.79	0.4	14.7	7
4/30/75	15:53:39	271.0	2.5	27.1	4.41	3.37	0.0	29.7	9	5.7	1.09	1.01	4.2	6.7	3
4/30/75	15:53:44	270.6	2.5	26.1	4.29	3.33	0.0	29.4	9	8.3	0.95	0.95	7.4	9.3	2
4/30/75	15:53:44	270.3	2.5	22.3	1.76	1.39	0.0	23.9	8	4.1	1.27	1.03	2.0	5.5	4
4/30/75	15:53:44	270.3	3.5	22.0	2.54	2.05	0.0	24.5	12	4.6	3.31	3.24	0.8	8.6	4
4/30/75	15:53:44	270.8	3.5	21.6	2.22	1.89	0.0	24.8	11	6.4	1.71	1.32	4.2	9.0	4
4/30/75	15:53:44	271.2	3.5	24.4	3.34	2.94	0.0	26.8	11	4.5	1.95	1.71	1.9	7.2	4
4/30/75	15:53:48	271.7	3.5	24.0	3.26	2.70	0.0	26.8	11	2.7	2.04	1.71	0.3	6.4	7
4/30/75	15:53:48	272.0	4.5	19.6	1.11	0.96	0.0	20.8	6	7.6	1.07	1.07	6.5	8.7	2
4/30/75	15:53:48	271.6	4.5	20.6	0.46	0.40	0.0	21.1	5	3.2	0.0	0.0	3.2	3.2	1
4/30/75	15:53:48	271.2	4.5	19.1	1.16	0.99	0.0	20.5	9	4.5	0.96	0.87	3.2	5.8	4
4/30/75	15:53:48	270.9	4.5	18.9	0.91	0.75	0.0	20.3	6	4.0	2.95	2.95	1.0	6.9	2
4/30/75	15:54: 3	270.6	4.5	20.9	1.22	1.18	0.0	22.3	3	5.8	3.15	3.15	2.7	9.0	2
4/30/75	15:54: 3	270.3	4.5	20.1	1.36	0.88	0.0	20.8	5	2.1	0.0	0.0	2.1	2.1	1
4/30/75	15:54: 3	270.0	4.5	19.5	1.83	1.53	0.0	22.0	8	5.0	2.05	1.68	1.6	6.8	4
4/30/75	15:54: 3	270.9	0.4	27.1	4.59	4.25	0.0	32.2	10	6.5	2.45	2.22	4.0	9.8	3
4/30/75	15:54: 3	271.4	0.4	27.7	5.35	4.73	0.0	34.0	16	8.5	2.36	1.89	4.2	11.9	6
4/30/75	15:56:47	271.8	0.4	25.0	3.99	3.42	0.0	29.8	26	8.7	5.48	4.48	0.5	18.7	16
4/30/75	15:56:47	271.7	0.4	29.0	6.64	5.77	0.0	35.5	27	9.2	5.19	4.35	1.5	21.5	16
4/30/75	15:56:47	271.3	0.4	28.9	5.75	4.77	0.0	34.5	23	6.5	4.03	3.36	0.1	13.2	14
4/30/75	15:56:47	271.0	0.4	28.3	5.48	5.09	0.0	33.7	23	7.0	3.52	2.74	3.9	15.1	10
4/30/75	15:56:47	270.5	0.4	29.5	4.93	3.84	0.0	34.5	22	7.7	4.61	4.16	2.7	15.8	11
4/30/75	15:56:51	270.2	0.4	29.1	5.13	4.08	0.0	34.1	26	7.2	4.82	3.66	1.9	20.4	14
4/30/75	15:55:51	270.2	1.4	33.4	7.28	6.14	0.0	39.0	36	6.8	4.60	3.71	0.9	16.3	19
4/30/75	15:56:51	270.7	1.4	30.5	5.14	4.50	0.0	36.3	33	5.6	3.34	2.91	1.0	11.9	20
4/30/75	15:56:51	271.2	1.4	28.2	5.00	4.46	0.0	33.2	33	7.6	3.08	2.32	0.9	14.0	13
4/30/75	15:56:51	271.7	1.4	29.1	6.25	5.16	0.0	36.0	30	7.5	3.78	3.47	2.3	12.7	10
4/30/75	15:56:55	272.0	1.4	29.0	6.30	5.38	0.0	36.8	28	9.2	4.80	4.32	2.8	16.0	11
4/30/75	15:56:55	272.0	2.5	26.3	3.30	2.70	0.0	29.7	18	6.0	2.35	1.74	2.9	11.8	10
4/30/75	15:56:55	271.6	2.5	26.5	5.06	3.93	0.0	33.0	24	8.8	2.99	2.06	2.3	14.0	9
4/30/75	15:56:55	271.2	2.5	26.1	4.05	3.41	0.0	31.9	25	6.0	3.07	2.61	1.9	12.1	12
4/30/75	15:56:55	270.9	2.5	26.2	3.79	3.30	0.0	30.2	25	6.0	2.64	2.33	2.1	11.1	14
4/30/75	15:57: 0	270.5	2.5	26.6	5.92	5.07	0.0	32.4	33	4.7	3.24	2.66	0.2	12.6	17
4/30/75	15:57: 0	270.3	2.5	27.2	5.51	4.71	0.0	33.0	36	5.0	2.81	2.39	0.7	10.2	17
4/30/75	15:57: 0	270.0	2.5	28.2	5.70	4.66	0.0	33.5	39	6.5	3.72	3.11	1.6	15.8	21
4/30/75	15:57: 0	271.4	3.5	23.8	4.12	3.33	0.0	30.2	28	5.8	3.13	2.17	1.9	13.6	14
4/30/75	15:57: 0	271.8	3.5	25.3	4.06	3.42	0.0	29.6	23	6.3	3.68	3.09	1.3	12.0	11
4/30/75	15:57: 4	271.8	4.4	22.4	2.08	1.51	0.0	24.2	18	6.4	3.64	3.18	1.2	12.1	7
4/30/75	15:57: 4	271.4	4.4	22.7	2.28	1.83	0.0	25.1	19	5.4	1.85	1.65	2.9	8.4	8
4/30/75	15:57: 4	271.1	4.4	21.6	2.56	2.16	0.0	24.6	24	7.8	4.94	4.53	1.6	15.2	10
4/30/75	15:57: 4	270.8	4.4	22.0	2.31	1.94	0.0	25.2	26	5.3	3.13	2.44	1.2	12.2	13
4/30/75	15:57: 4	270.4	4.4	23.1	3.12	2.70	0.0	27.7	26	8.3	4.22	3.73	2.6	14.7	12
4/30/75	16: 0:24	270.7	0.4	32.2	5.76	4.66	0.0	36.3	28	8.0	5.54	4.40	1.2	20.7	16
4/30/75	16: 0:24	271.1	0.4	29.0	5.54	4.84	0.0	34.9	28	7.5	7.36	4.59	1.8	31.8	14
4/30/75	16: 0:24	271.6	0.4	29.1	6.38	5.52	0.0	35.2	28	6.4	4.93	3.84	0.9	18.6	14
4/30/75	16: 0:24	271.9	0.4	29.9	6.45	5.45	0.0	35.2	28	6.1	5.28	3.80	2.1	21.4	14
4/30/75	16: 0:24	270.3	0.4	32.2	4.51	3.47	0.0	36.3	53	6.8	4.21	3.50	0.4	16.1	34
4/30/75	16: 0:28	270.7	0.4	33.9	4.66	3.25	0.0	37.1	51	7.8	5.90	4.19	0.8	29.9	25
4/30/75	16: 0:28	271.1	0.4	34.2	6.23	4.46	0.0	38.7	54	8.4	5.55	3.99	1.2	23.7	31
4/30/75	16: 0:28	271.6	0.4	34.2	7.42	5.90	0.0	38.7	53	7.1	4.06	2.94	0.8	21.2	31
4/30/75	16: 0:28	272.0	0.4	34.1	6.86	5.51	0.0	39.3	48	7.2	4.32	3.17	1.1	20.5	28
4/30/75	16: 0:28	271.4	1.4	29.7	4.14	3.28	0.0	34.5	54	7.9	5.14	4.16	0.7	22.4	27
4/30/75	16: 0:32	271.0	1.4	28.8	3.81	3.10	0.0	33.2	55	7.0	4.77	3.99	0.6	17.0	31
4/30/75	16: 0:32	270.4	1.4	27.9	3.97	3.15	0.0	34.5	64	7.8	3.78	3.03	1.7	17.7	33
4/30/75	16: 0:32	270.0	1.4	29.1	5.77	5.02	0.0	37.1	66	7.8	4.95	4.37	1.6	18.4	33
4/30/75	16: 0:32	270.0	2.5	26.1	4.83	3.85	0.0	32.5	34	5.3	3.17	2.83	0.4	10.0	15
4/30/75	16: 0:32	270.6	2.5	26.0	4.73	3.98	0.0	31.5	41	5.7	3.37	3.07	1.1	11.8	18
4/30/75	16: 0:36	271.2	2.5	24.5	3.38	2.63	0.0	29.1	41	7.1	4.52	3.94	1.2	16.8	18
4/30/75	16: 0:36	271.8	2.5	23.8	3.34	2.92	0.0	28.2	51	7.3	4.40	3.73	0.2	16.5	23
4/30/75	16: 0:36	271.8	3.4	23.1	2.70	2.09	0.0	27.0	50	5.7	2.85	2.45	0.2	11.4	22
4/30/75	16: 0:36	271.3	3.4	21.5	2.75	2.37	0.0	26.4	50	5.8	3.14	2.62	0.6	12.7	21
4/30/75	16: 0:36	270.9	3.4	23.1	2.89	2.51	0.0	27.2	34	5.6	3.92	3.35	0.2	12.6	16
4/30/75	16: 0:56	270.0	3.4	23.0	2.40	1.90	0.0	25.8	24	5.9	4.23	3.82	0.4	13.4	8
4/30/75	16: 0:56	271.3	4.5	19.2	1.02	0.79	0.0	20.8	23	6.3	3.14	2.71	2.7	11.3	8
4/30/75	16: 0:56	271.8	4.5	19.3	1.50	1.17	0.0	22.6	28	8.6	2.56	2.35	5.0	11.8	8
4/30/75	16: 0:56	271.4	0.4	34.1	7.19	5.86	0.0	39.5	55	8.6	4.74	3.99	0.9	19.4	32
4/30/75	16: 3:21	271.0	0.4	34.0	6.36	5.14	0.0	39.3	52	7.9	4.31	3.53	2.4	17.4	29
4/30/75	16: 3:21	270.5	0.4	33.3	5.40	3.93	0.0	38.2	52	6.6	4.85	3.92	0.3	17.3	31
4/30/75	16: 3:21	270.1	0.4	31.7	4.88	3.74	0.0	36.6	55	7.0	5.48	3.74	0.8	29.1	28
4/30/75	16: 3:21	270.1	0.4	29.2	5.55	4.70	0.0	34.5	49	6.2	4.69	3.42	1.0	22.2	24
4/30/75	16: 3:21	270.5	0.4	31.0	6.68	5.99	0.0	38.2	53	9.1	5.45	4.63	0.7	20.9	27
4/30/75	16: 3:25	271.0	0.4	30.1	6.37	5.78	0.0	36.6	63	9.4	5.46	4.51	0.2	21.1	33
4/30/75	16: 3:25	271.4	0.4	30.2	5.69	5.10	0.0	36.8	59	7.9	4.12	3.63	1.3	15.0	30
4/30/75	16: 3:25	271.7	1.4	25.3	2.83	2.36	0.0	30.6	58	8.0	5.30	4.47	0.1	16.7	29
4/30/75	16: 3:25	271.2	1.4	25.8	4.19	3.52	0.0	31.6	66	7.8	5.95	5.17	0.7	21.5	29
4/30/75	16: 3:25	270.7	1.4	25.7	4.43	3.83	0.0	31.2	58	8.0	5.11	4.41	1.2	17.0	24
4/30/75	16: 3:33	270.3	1.4	27.0	5.27	4.55	0.0	33.2	56	7.0	4.55	3.48	0.7	19.1	29
4/30/75	16: 3:33	270.3	2.5	25.8	3.50	3.07	0.0	31.5	31	8.6	5.12	3.93	2.7	21.1	14
4/30/75	16: 3:33	270.9	2.5	22.9	2.36	2.02	0.0	26.2	31	5.4	4.33	3.90	0.2	11.8	8
4/30/75	16: 3:33	271.5	2.5	22.4	1.93	1.58	0.0	25.8	29	9.1	4.42	3.54	2.7	19.2	14
4/30/75	16: 3:33	271.6	3.4	19.9	1.56	1.24	0.0	22.5	22	6.0	5.24	4.59	0.3	14.9	8
4/30/75	16: 3:52	270.6	3.4	20.1	2.19	1.98	0.0	22.5	13	4.6	3.13	2.74	1.1	8.7	3
4/30/75	16: 3:52	271.5	4.5	17.9	0.43	0.37	0.0	18.2	4	2.9	0.0	0.0	2.9	2.9	1
4/30/75	16: 3:52	272.0	4.5	18.0	0.80	0.67	0.0	19.0	16	2.3	0.17	0.17	2.1	2.4	2
4/30/75	16: 3:52	272.0	0.4	30.9	5.01	3.89	0.0	35.2	53	8.3	5.35	4.26	0.1	23.7	29
4/30/75	16: 3:52	271.5	0.4	30.7	4.34	3.46	0.0	35.2	53	7.9	6.08	5.30	0.4	21.5	29
4/30/75	16: 6:16	271.1	0.4	29.9	5.43	4.92	0.0	36.6	61	8.0	3.78	3.11	1.2	15.2	32
4/30/75	16: 6:16	270.6	0.4	29.9	6.56	5.73	0.0	37.1	64	9.8	4.80	4.01	0.8	20.3	27
4/30/75	16: 6:16	270.2	0.4	29.3	5.53	4.68	0.0	35.2	50	7.8	4.79	3.45	0.2	23.5	25
4/30/75	16: 6:16	270.0	0.4	31.1	3.65	2.86	0.0	36.6	28	5.9	3.92	2.98	0.5	15.7	19
4/30/75	16: 6:16	270.4	0.4	30.9	5.94	4.74	0.0	34.9	35	7.1	2.88	2.65	3.2	11.2	16
4/30/75	16: 6:20	270.9	0.4	30.1	5.63	4.44	0.0	35.2	40	8.1	3.66	2.83	0.2	15.4	16
4/30/75	16: 6:20	271.3	0.4	29.0	5.58	4.30	0.0	33.5	47	7.4	4.76	4.10	1.4	17.3	22
4/30/75	16: 6:20	271.8	0.4	27.9	3.81	2.55	0.0	30.7	42	7.9	4.91	3.73	1.7	20.2	[illegible]
4/30/75	16: 6:20	271.2	1.4	26.8	3.77	2.79	0.0	33.2	39	6.8	5.98	4.30	0.2	25.9	[illegible]
4/30/75	16: 6:20	270.7	1.4	28.2	3.39	2.43	0.0	31.9	33	7.1	3.57	3.21	1.7	12.5	[illegible]
4/30/75	16: 6:28	270.3	1.4	29.2	4.49	3.31	0.0	33.0	34	8.1	4.04	3.36	1.3	16.2	[illegible]
4/30/75	16: 6:28	270.3	2.5	28.2	6.27	5.28	0.0	34.1	18	10.3	5.17	4.01	2.1	20.4	[illegible]

2-BIN 4/30/75

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	16: 6:28	271.0	2.5	25.6	4.20	3.49	0.0	31.4	19	4.9	4.16	3.10	0.3	12.8	6
4/30/75	16: 6:47	271.0	3.4	18.6	1.12	1.05	0.0	19.8	8	4.2	2.40	2.40	1.8	6.6	2
4/30/75	16: 6:47	270.5	3.4	20.9	1.89	1.53	0.0	24.2	18	9.7	2.83	2.19	7.1	15.1	5
4/30/75	16: 6:47	271.9	0.4	26.8	4.41	3.70	0.0	32.1	60	7.6	4.51	3.47	0.2	22.3	34
4/30/75	16: 9: 8	271.4	0.4	28.0	3.92	2.99	0.0	31.5	45	7.5	4.90	4.32	0.7	16.8	22
4/30/75	16: 9: 8	270.4	0.4	31.3	5.78	4.10	0.0	35.5	36	7.1	3.65	3.02	3.0	16.5	19
4/30/75	16: 9: 8	270.1	0.4	29.0	4.22	3.59	0.0	33.2	29	7.1	5.73	4.43	1.0	20.3	15
4/30/75	16: 9: 8	270.5	0.4	28.9	5.35	4.49	0.0	34.5	29	11.7	6.29	5.76	0.8	21.0	13
4/30/75	16: 9: 8	271.5	0.4	30.2	5.54	4.94	0.0	37.6	37	6.8	4.05	3.57	2.5	14.7	18
4/30/75	16: 9:15	271.9	0.4	28.6	4.62	4.01	0.0	33.7	41	7.7	4.49	3.60	1.7	19.4	22
4/30/75	16: 9:15	271.6	1.4	24.9	3.58	2.98	0.0	29.8	39	8.3	3.76	2.73	2.3	16.7	16
4/30/75	16: 9:15	271.1	1.4	26.7	3.15	2.35	0.0	31.2	35	6.1	5.05	4.03	1.2	19.4	22
4/30/75	16: 9:15	270.6	1.4	29.5	4.53	3.51	0.0	34.1	34	7.6	4.69	4.14	1.5	15.8	14
4/30/75	16: 9:15	270.1	2.5	22.7	3.12	2.67	0.0	27.5	41	6.0	3.50	3.11	0.5	12.7	18
4/30/75	16: 9:19	270.6	2.5	25.1	4.48	3.71	0.0	32.4	30	7.7	4.20	3.78	2.3	13.7	13
4/30/75	16: 9:19	271.3	2.5	23.7	2.53	2.22	0.0	27.7	25	6.2	2.77	2.35	2.7	11.2	10
4/30/75	16: 9:19	271.8	2.5	20.7	2.24	1.88	0.0	23.9	17	7.6	5.53	4.32	0.8	16.2	4
4/30/75	16: 9:38	270.2	3.4	19.2	0.89	0.65	0.0	19.8	11	3.9	1.47	1.31	1.6	5.6	5
4/30/75	16: 9:38	271.8	0.4	25.9	3.51	3.02	0.0	30.7	45	8.2	3.42	2.98	2.6	16.0	22
4/30/75	16:11:59	271.3	0.4	29.0	5.17	4.33	0.0	34.5	38	7.8	5.12	4.44	0.3	16.6	17
4/30/75	16:11:59	270.8	0.4	29.7	4.68	4.00	0.0	34.5	32	9.0	5.27	4.43	1.8	21.1	16
4/30/75	16:11:59	270.3	0.4	29.8	4.38	3.37	0.0	34.5	31	7.4	4.68	3.96	0.9	17.1	16
4/30/75	16:11:59	270.1	0.4	26.9	3.48	3.04	0.0	31.9	46	8.1	3.99	3.18	1.8	16.2	21
4/30/75	16:11:59	270.5	0.4	26.8	3.29	2.68	0.0	31.5	51	8.6	4.17	3.63	2.5	17.8	26
4/30/75	16:12: 3	271.0	0.4	26.7	3.86	3.22	0.0	32.2	48	5.9	3.35	2.80	0.4	11.7	24
4/30/75	16:12: 3	271.8	0.4	28.8	4.07	3.41	0.0	33.2	32	6.9	4.57	4.12	0.2	14.4	16
4/30/75	16:12: 3	271.5	1.4	25.9	3.33	2.69	0.0	30.2	39	10.1	3.98	3.48	2.7	17.6	16
4/30/75	16:12: 3	271.1	1.4	26.2	2.70	2.00	0.0	30.2	47	8.0	4.24	3.68	0.4	14.3	23
4/30/75	16:12: 3	270.5	1.4	25.3	3.25	2.59	0.0	30.5	63	8.1	5.14	4.17	0.1	21.2	32
4/30/75	16:12:11	270.2	2.4	24.7	3.24	2.73	0.0	29.4	55	6.9	4.30	3.51	0.9	16.3	25
4/30/75	16:12:11	270.8	2.4	24.7	3.10	2.58	0.0	29.2	62	6.9	3.97	3.34	0.7	15.1	31
4/30/75	16:12:11	271.4	2.4	23.3	2.96	2.43	0.0	27.7	52	8.0	5.89	4.80	1.2	25.4	24
4/30/75	16:12:11	271.9	2.4	23.0	2.81	2.41	0.0	27.5	31	4.8	3.14	2.49	1.1	11.7	17
4/30/75	16:12:11	271.6	3.4	18.8	0.84	0.68	0.0	19.4	3	2.6	0.0	0.0	2.6	2.6	1
4/30/75	16:12:15	271.1	3.4	21.6	2.65	2.21	0.0	25.8	22	6.6	4.76	3.63	1.2	15.4	6
4/30/75	16:12:15	270.6	3.4	22.0	2.33	1.99	0.0	25.5	38	6.5	6.04	3.05	1.1	21.5	13
4/30/75	16:12:15	270.2	3.4	22.8	2.11	1.66	0.0	25.8	38	5.5	3.28	2.53	0.2	11.9	17
4/30/75	16:12:15	270.5	4.4	21.7	3.22	2.86	0.0	25.8	35	5.3	1.92	1.65	2.2	8.6	13
4/30/75	16:12:15	271.1	4.4	22.4	2.33	1.90	0.0	25.1	32	4.7	2.41	1.95	1.0	9.9	14
4/30/75	16:14:55	271.7	4.4	20.6	1.91	1.63	0.0	23.3	26	6.5	3.71	2.91	2.5	13.2	10
4/30/75	16:14:55	271.7	0.3	28.6	4.84	4.08	0.0	34.1	37	8.9	5.27	4.57	0.9	19.3	18
4/30/75	16:14:55	271.1	0.3	28.3	4.14	3.59	0.0	34.5	40	6.9	4.96	3.98	0.9	22.0	21
4/30/75	16:14:55	270.2	0.3	27.0	3.37	2.60	0.0	31.5	44	6.6	5.40	4.67	0.5	20.7	23
4/30/75	16:14:55	270.3	0.4	27.0	3.93	3.37	0.0	32.2	45	6.7	4.21	3.78	0.3	13.5	22
4/30/75	16:14:59	270.7	0.4	27.6	3.21	2.52	0.0	32.5	55	6.1	3.47	2.82	0.1	13.6	30
4/30/75	16:14:59	271.1	0.4	27.6	3.09	2.45	0.0	32.4	56	7.5	4.86	4.01	0.6	19.2	27
4/30/75	16:14:59	271.9	0.4	27.8	4.43	3.38	0.0	32.5	57	7.5	5.81	4.20	0.6	26.9	25
4/30/75	16:14:59	272.0	1.4	26.7	4.16	3.42	0.0	33.2	58	8.0	4.52	3.76	0.9	18.0	24
4/30/75	16:14:59	271.5	1.4	28.4	4.94	3.92	0.0	34.5	60	7.6	4.44	3.14	0.6	20.2	26
4/30/75	16:15: 3	271.1	1.4	28.2	4.98	4.09	0.0	34.0	62	6.7	4.5[illegible]	3.65	1.1	18.6	31
4/30/75	16:15: 3	270.6	1.4	28.4	4.90	4.14	0.0	33.0	54	8.5	6.2[illegible]	5.08	0.4	22.2	22
4/30/75	16:15: 3	270.3	1.4	27.9	5.30	4.66	0.0	34.1	45	7.6	4.98	4.24	1.3	17.6	22
4/30/75	16:15: 3	270.2	2.4	27.2	4.85	3.70	0.0	31.9	23	4.6	3.95	3.50	0.6	12.7	10
4/30/75	16:15: 3	270.7	2.4	27.3	5.09	4.33	0.0	32.7	31	6.0	3.87	3.40	1.7	14.7	12
4/30/75	16:15: 8	271.2	2.4	27.4	4.63	3.74	0.0	31.9	41	7.0	4.25	3.42	0.5	18.5	18
4/30/75	16:15: 8	271.8	2.4	26.9	4.95	4.29	0.0	32.8	56	7.0	4.23	3.62	0.4	16.2	26
4/30/75	16:15: 8	270.9	3.4	22.2	2.00	1.57	0.0	25.5	39	6.6	3.47	2.79	1.0	12.8	15
4/30/75	16:15: 8	270.5	3.4	22.7	1.88	1.63	0.0	25.5	21	4.1	2.45	2.16	0.3	8.0	7
4/30/75	16:15: 8	270.1	3.4	21.8	2.67	2.03	0.0	25.5	15	8.6	2.01	1.83	5.6	10.5	4
4/30/75	16:15:27	270.5	4.4	20.0	1.46	1.23	0.0	21.5	13	4.5	2.44	2.06	1.5	7.4	3
4/30/75	16:15:27	271.6	4.4	21.3	1.80	1.48	0.0	23.5	27	5.5	3.48	3.10	1.5	12.1	9
4/30/75	16:15:27	271.7	0.3	27.3	4.39	3.42	0.0	31.1	57	5.7	5.37	4.47	0.2	20.2	29
4/30/75	16:15:27	271.2	0.3	28.1	4.17	3.33	0.0	33.6	54	7.5	4.02	3.31	0.3	16.6	29
4/30/75	16:17:57	270.5	0.3	27.4	3.65	2.93	0.0	33.2	44	6.5	4.49	4.00	0.2	15.0	23
4/30/75	16:17:57	270.1	0.3	26.5	1.60	1.05	0.0	27.7	5	11.1	0.0	0.0	11.1	11.1	1
4/30/75	16:17:57	270.0	0.4	26.6	4.05	3.43	0.0	32.0	36	7.6	3.61	3.19	2.0	12.7	19
4/30/75	16:17:57	270.4	0.4	25.2	3.03	2.74	0.0	30.2	33	5.6	4.04	3.15	0.9	16.8	15
4/30/75	16:17:57	270.8	0.4	26.6	3.57	3.04	0.0	30.7	30	7.5	4.41	3.64	1.4	17.5	12
4/30/75	16:18: 2	271.3	0.4	27.7	4.11	3.36	0.0	32.2	26	6.9	4.28	3.73	1.8	14.2	10
4/30/75	16:19: 2	271.7	0.4	28.4	4.94	4.11	0.0	34.1	32	7.7	2.84	2.11	1.0	12.0	16
4/30/75	16:18: 2	271.4	1.4	27.3	4.61	3.92	0.0	32.4	33	6.3	3.56	2.95	1.1	12.9	14
4/30/75	16:18: 2	271.1	1.4	26.7	4.31	3.64	0.0	31.5	32	6.8	3.62	2.95	0.4	12.4	13
4/30/75	16:18: 2	270.6	1.4	27.5	3.53	2.92	0.0	31.2	29	9.6	6.76	6.15	1.1	21.0	11
4/30/75	16:18: 6	270.2	1.4	27.3	3.23	2.59	0.0	31.5	28	5.7	2.38	1.75	1.7	10.6	13
4/30/75	16:18: 6	270.3	2.4	26.7	5.26	4.72	0.0	32.5	19	10.3	5.83	4.57	4.0	21.6	6
4/30/75	16:18: 6	270.9	2.4	26.0	4.31	3.43	0.0	31.1	26	7.4	3.13	2.80	3.1	12.3	11
4/30/75	16:18: 6	271.4	2.4	24.1	3.45	2.92	0.0	28.5	32	5.3	3.69	2.70	1.9	16.0	16
4/30/75	16:18: 6	271.9	2.4	24.4	3.50	2.89	0.0	29.5	30	5.5	3.93	3.12	1.3	16.9	16
4/30/75	16:18:10	271.6	3.4	21.4	2.21	1.84	0.0	24.7	19	6.4	2.54	2.20	2.7	9.5	4
4/30/75	16:18:10	271.1	3.4	22.9	2.59	2.10	0.0	28.8	32	7.4	2.78	2.01	4.1	14.2	9
4/30/75	16:18:10	270.7	3.4	23.5	4.30	3.77	0.0	30.6	23	11.1	9.87	7.97	0.9	32.1	7
4/30/75	16:18:10	270.3	3.4	24.5	4.88	4.34	0.0	32.8	20	10.7	5.35	3.74	3.7	21.1	6
4/30/75	16:18:10	270.0	3.4	26.7	4.29	3.67	0.0	31.2	10	3.9	3.55	3.35	0.3	8.9	4
4/30/75	16:18:30	271.3	4.4	19.0	1.69	1.52	0.0	21.2	8	6.3	3.26	2.85	2.0	10.0	3
4/30/75	16:18:30	271.8	4.4	19.2	1.41	1.12	0.0	20.8	12	6.8	3.27	2.57	2.9	11.9	4
4/30/75	16:18:30	271.8	0.3	28.5	4.21	3.69	0.0	33.2	40	7.4	2.70	2.30	2.2	11.8	18
4/30/75	16:21: 0	271.4	0.3	28.1	4.07	3.02	0.0	31.9	29	8.2	4.08	3.64	3.0	14.9	13
4/30/75	16:21: 0	271.0	0.3	27.1	4.19	3.47	0.0	31.5	31	6.5	4.33	3.75	0.1	15.7	16
4/30/75	16:21: 0	270.6	0.3	27.4	4.18	3.62	0.0	32.2	30	7.2	3.34	3.02	2.3	11.9	11
4/30/75	16:21: 0	270.2	0.3	27.0	2.71	2.31	0.0	31.9	27	7.0	3.88	3.21	1.0	14.8	13
4/30/75	16:21: 0	270.2	0.4	25.5	3.23	2.60	0.0	30.0	32	7.0	5.53	4.50	0.1	19.1	14
4/30/75	16:21: 4	270.6	0.4	25.2	3.32	2.86	0.0	28.5	30	7.2	4.98	4.33	0.3	16.0	10
4/30/75	16:21: 4	271.1	0.4	25.3	4.06	3.71	0.0	30.6	31	7.4	4.06	3.04	2.3	18.6	12
4/30/75	16:21: 4	271.0	0.4	26.1	4.83	4.40	0.0	33.0	32	6.1	3.89	3.22	1.2	15.1	17
4/30/75	16:21: 4	271.8	0.4	26.6	4.67	4.19	0.0	33.5	30	8.3	5.55	4.18	1.2	23.4	14
4/30/75	16:21: 4	271.7	1.4	27.5	6.43	6.00	0.0	33.2	24	8.0	6.27	4.62	2.1	23.6	9
4/30/75	16:21: 8	271.2	1.4	25.7	4.39	3.94	0.0	30.2	17	6.8	6.73	5.60	0.7	18.0	4
4/30/75	16:21: 8	270.8	1.4	23.9	2.79	2.33	0.0	26.7	28	9.1	4.11	3.64	3.1	15.4	9
4/30/75	16:21: 8	270.4	1.4	24.5	2.68	2.07	0.0	28.2	33	10.1	4.60	3.64	3.6	19.6	12
4/30/75	16:21: 8	270.0	1.4	23.6	2.86	2.27	0.0	27.2	37	6.6	6.34	5.42	1.4	21.9	17
4/30/75	16:21: 8	270.0	2.5	20.9	2.22	1.97	0.0	23.8	14	6.5	4.27	4.06	2.2	13.0	6
4/30/75	16:21:12	270.5	2.5	24.3	4.01	3.47	0.0	29.5	25	9.5	6.27	4.82	0.2	21.0	10
4/30/75	16:21:12	271.1	2.5	24.1	4.38	3.73	0.0	31.5	33	6.8	5.35	4.23	0.5	18.5	16
4/30/75	16:21:12	271.6	2.5	23.5	3.56	3.13	0.0	29.2	25	8.7	5.07	4.23	3.4	17.7	6
4/30/75	16:21:12	271.9	3.4	20.4	1.03	0.72	0.0	21.2	8	7.4	0.0	0.0	7.4	7.4	1
4/30/75	16:21:12	271.4	3.5	20.5	2.12	1.80	0.0	22.4	5	8.8	0.0	0.0	8.8	8.8	1
4/30/75	16:21:17	271.1	3.4	19.9	1.76	1.49	0.0	22.5	10	9.3	4.10	3.82	5.0	15.2	4
4/30/75	16:24: 3	271.8	0.4	24.7	3.37	2.64	0.0	29.5	29	5.6	2.88	2.30	1.2	11.0	12
4/30/75	16:24: 3	271.1	0.4	26.2	4.08	3.65	0.0	31.6	29	7.1	4.81	3.37	2.9	19.6	9
4/30/75	16:24: 3	270.6	0.4	26.8	4.47	3.82	0.0	31.9	32	6.2	3.21	2.75	0.3	10.3	13
4/30/75	16:24: 3	270.3	0.4	25.9	3.58	3.16	0.0	30.5	33	6.7	5.36	4.02	0.3	21.9	16

2-BIN 4/30/75				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	16:24: 7	270.5	0.4	20.0	1.57	1.31	0.0	22.8	13	7.8	4.71	4.06	1.8	14.7	5
4/30/75	16:24: 7	271.0	0.4	23.2	2.19	1.93	0.0	27.0	23	7.7	4.09	3.44	2.2	15.1	11
4/30/75	16:24: 7	271.8	0.4	24.6	3.15	2.77	0.0	28.5	37	5.6	3.54	2.99	0.9	12.8	19
4/30/75	16:24: 7	271.8	1.4	24.7	3.19	2.68	0.0	28.1	21	9.8	5.51	4.77	3.6	19.4	5
4/30/75	16:24: 7	271.3	1.4	22.3	3.65	3.25	0.0	28.1	32	10.2	6.28	5.60	1.5	20.1	13
4/30/75	16:24:15	270.9	1.4	24.0	3.03	2.35	0.0	27.7	16	6.8	5.89	4.81	2.2	19.6	7
4/30/75	16:24:15	271.1	2.5	26.1	3.41	2.55	0.0	28.9	15	5.6	2.78	2.37	1.0	9.2	6
4/30/75	16:24:15	271.6	2.5	26.3	2.81	2.11	0.0	29.4	11	8.7	7.22	5.74	0.1	19.9	4
4/30/75	16:24:15	271.8	3.4	23.9	2.43	2.16	0.0	26.5	7	4.3	2.75	2.43	0.7	7.3	3
4/30/75	16:24:20	271.4	3.4	21.8	1.77	1.67	0.0	23.2	8	5.1	3.34	3.34	1.8	8.5	2
4/30/75	16:24:20	270.6	3.4	23.5	2.49	2.17	0.0	26.2	9	11.4	3.81	3.81	7.5	15.2	2
4/30/75	16:24:35	271.9	0.4	23.7	3.61	3.23	0.0	28.1	38	7.6	4.79	4.47	1.1	15.5	19
4/30/75	16:24:35	271.5	0.4	24.2	3.31	2.73	0.0	28.2	34	5.7	3.82	3.39	0.8	12.7	17
4/30/75	16:24:35	271.1	0.4	23.7	3.32	3.08	0.0	28.5	28	6.7	4.68	3.68	1.6	18.7	15
4/30/75	16:24:35	270.6	0.4	21.9	3.52	3.19	0.0	25.5	18	9.4	7.57	6.96	2.5	22.2	6
4/30/75	16:27: 8	272.0	0.4	23.2	2.50	2.22	0.0	25.5	10	12.1	6.24	5.10	1.9	18.8	4
4/30/75	16:27: 8	271.3	1.4	23.8	2.84	2.67	0.0	26.4	5	5.1	0.0	0.0	5.1	5.1	1
4/30/75	16:27:12	270.0	1.4	20.4	1.51	1.22	0.0	22.5	12	5.4	2.20	1.39	2.4	8.4	4
4/30/75	16:27:16	271.8	2.5	23.2	1.67	1.33	0.0	24.7	8	3.7	2.04	2.04	1.6	5.7	2
4/30/75	16:27:20	270.2	3.4	18.8	1.37	1.16	0.0	19.8	4	3.4	2.08	1.86	1.1	6.2	3
4/30/75	16:27:20	270.2	4.4	18.6	0.40	0.40	0.0	19.0	4	3.5	0.0	0.0	3.5	3.5	1
4/30/75	16:29:59	271.8	0.3	22.5	1.60	1.04	0.0	23.9	9	6.3	0.59	0.59	5.7	6.9	2
4/30/75	16:29:59	270.4	0.3	18.6	0.73	0.70	0.0	19.0	2	4.3	0.0	0.0	4.3	4.3	1
4/30/75	16:29:59	270.0	0.4	22.3	3.04	2.74	0.0	27.2	31	7.4	4.65	3.67	1.1	17.5	14
4/30/75	16:30: 3	270.4	0.4	25.4	3.54	3.00	0.0	30.0	24	11.2	8.56	7.25	0.4	30.4	12
4/30/75	16:30: 3	270.8	0.4	26.7	3.28	2.57	0.0	29.4	21	9.8	4.65	4.21	2.5	16.6	9
4/30/75	16:30: 3	271.2	0.4	24.8	2.74	2.31	0.0	28.9	16	7.6	4.55	3.69	1.4	15.7	6
4/30/75	16:30: 3	271.6	1.4	20.8	1.99	1.81	0.0	23.8	7	3.0	0.0	0.0	3.0	3.0	1
4/30/75	16:30: 3	271.1	1.4	23.0	1.41	1.28	0.0	24.6	17	6.7	3.09	2.64	2.1	10.9	6
4/30/75	16:30: 7	270.6	1.4	24.8	2.72	2.14	0.0	28.5	26	7.0	3.35	2.45	0.8	14.6	12
4/30/75	16:30: 7	270.2	1.4	23.6	2.82	2.24	0.0	26.4	21	6.5	4.54	3.80	0.3	14.6	9
4/30/75	16:30: 7	270.0	2.5	18.7	1.75	1.57	0.0	20.9	9	5.9	3.17	2.89	1.5	9.0	3
4/30/75	16:30: 7	270.6	2.5	18.4	1.03	0.96	0.0	19.4	8	4.9	0.0	0.0	4.9	4.9	1
4/30/75	16:30: 7	271.1	2.5	20.3	2.12	1.92	0.0	22.6	21	7.7	6.71	6.07	1.0	19.7	8
4/30/75	16:30:14	271.8	2.5	19.3	0.91	0.79	0.0	20.3	11	2.1	0.0	0.0	2.1	2.1	1
4/30/75	16:30:14	271.8	0.2	19.9	1.43	1.22	0.0	21.7	6	10.4	4.62	4.62	5.8	15.0	2
4/30/75	16:30:14	270.6	0.3	23.9	2.91	2.47	0.0	26.7	21	6.4	5.40	4.49	0.6	15.1	11
4/30/75	16:30:14	270.0	0.4	25.8	4.04	3.25	0.0	30.0	24	7.5	4.62	3.27	1.5	19.0	10
4/30/75	16:32:45	271.9	1.4	24.4	2.46	2.11	0.0	27.6	20	6.3	5.00	4.13	0.5	16.4	10
4/30/75	16:32:45	271.4	1.4	22.1	1.97	1.48	0.0	25.8	23	5.4	2.63	2.36	0.9	9.1	11
4/30/75	16:32:45	271.0	1.4	21.5	2.28	2.03	0.0	24.6	16	9.0	4.64	3.41	3.5	17.3	5
4/30/75	16:32:45	270.5	1.4	19.9	1.50	1.30	0.0	22.0	12	6.2	5.83	5.73	0.3	13.4	4
4/30/75	16:32:45	270.1	1.4	19.3	0.61	0.46	0.0	19.7	4	7.5	0.0	0.0	7.5	7.5	1
4/30/75	16:32:53	271.6	2.5	18.6	1.35	1.22	0.0	19.9	6	6.0	1.34	1.11	4.4	7.7	3
4/30/75	16:33:13	272.0	0.4	24.0	2.97	2.43	0.0	28.5	23	7.6	4.49	4.18	1.7	15.0	10
4/30/75	16:33:13	271.1	0.3	22.7	2.29	1.87	0.0	25.5	25	6.0	3.53	3.03	2.0	13.7	13
4/30/75	16:33:13	270.7	0.3	22.0	1.94	1.71	0.0	25.1	17	7.6	5.16	4.43	1.0	13.6	3
4/30/75	16:33:13	270.3	0.3	20.8	2.16	1.75	0.0	23.7	13	5.7	4.80	4.20	1.2	14.1	5
4/30/75	16:36:19	272.0	0.4	19.9	1.93	1.62	0.0	22.6	16	6.9	5.14	4.45	1.2	16.1	6
4/30/75	16:42:17	270.6	1.4	23.0	3.01	2.37	0.0	25.8	4	18.7	0.47	0.47	18.2	19.2	2
4/30/75	16:42:22	270.0	1.4	24.8	2.10	1.94	0.0	27.5	8	6.1	3.15	3.15	3.0	9.3	2
4/30/75	16:42:22	271.4	2.5	20.0	1.67	1.38	0.0	22.0	11	8.0	0.79	0.74	7.4	9.2	3
4/30/75	16:42:26	271.5	3.4	21.5	1.25	1.16	0.0	23.2	6	3.4	0.0	0.0	3.4	3.4	1
4/30/75	16:42:26	271.1	3.4	24.3	1.17	0.79	0.0	25.1	7	1.4	0.45	0.42	1.1	2.0	3
4/30/75	16:42:26	270.8	3.4	24.3	1.07	0.94	0.0	25.5	6	5.8	0.22	0.22	5.6	6.0	2
4/30/75	16:42:46	271.1	4.4	21.5	2.21	1.91	0.0	23.9	7	0.2	0.0	0.0	0.2	0.2	1
4/30/75	16:45:27	270.4	0.4	19.4	0.59	0.57	0.0	19.8	2	7.4	0.0	0.0	7.4	7.4	1
4/30/75	16:45:30	271.7	1.4	20.5	1.63	1.53	0.0	22.8	6	9.0	8.75	8.76	0.2	17.7	2
4/30/75	16:45:40	270.8	2.5	23.3	0.88	0.68	0.0	23.9	4	0.2	0.0	0.0	0.2	0.2	1
4/30/75	16:45:40	271.3	2.5	26.8	[illegible]	4.35	0.0	31.6	9	12.6	5.28	5.12	7.0	19.4	4
4/30/75	16:45:40	271.2	3.4	21.2	1.43	1.26	0.0	22.6	3	12.1	0.0	0.0	12.1	12.1	1
4/30/75	16:45:43	270.9	3.4	25.5	2.04	1.78	0.0	27.6	7	4.6	1.38	1.21	3.1	6.4	3
4/30/75	16:45:43	270.5	3.4	27.5	3.68	3.14	0.0	31.0	9	8.2	5.17	4.87	0.9	12.2	3
4/30/75	16:45:43	270.2	3.4	28.2	3.66	2.97	0.0	30.7	8	4.6	0.0	0.0	4.6	4.6	1
4/30/75	16:45:59	271.6	0.4	24.6	1.44	1.32	0.0	26.6	4	6.0	3.80	3.80	2.2	9.8	2
4/30/75	16:48:20	271.2	0.4	23.3	0.29	0.25	0.0	23.5	4	8.2	0.0	0.0	8.2	8.2	1
4/30/75	16:48:20	270.2	0.4	22.8	1.44	1.27	0.0	24.5	6	7.9	3.54	3.33	2.9	10.4	3
4/30/75	16:48:24	270.6	0.4	26.5	1.50	1.24	0.0	27.7	3	0.5	0.0	0.0	0.5	0.5	1
4/30/75	16:48:24	271.0	0.4	24.8	4.42	3.58	0.0	28.0	6	1.5	0.0	0.0	1.5	1.5	1

3-BIN 4/30/75 — REFLECTIVITY (10 log Z) — LIQUID WATER CONTENT (g/m^3)

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	15:53:	271.9	0.4	23.0	2.79	2.32	0.0	27.9	23	6.2	3.91	2.79	2.0	16.4	10
4/30/75	15:53:31	271.6	0.4	24.9	2.86	2.40	0.0	29.9	19	4.1	3.60	3.15	0.2	10.9	12
4/30/75	15:53:31	271.3	0.4	26.4	2.68	2.15	0.0	31.2	17	6.9	4.40	3.88	1.9	14.3	9
4/30/75	15:53:31	270.9	0.4	27.2	4.87	4.08	0.0	33.2	19	6.2	4.29	3.25	0.3	16.5	10
4/30/75	15:53:31	270.5	0.4	25.1	4.57	3.74	0.0	30.3	15	7.1	3.86	3.24	2.5	14.5	7
4/30/75	15:53:35	270.2	0.4	23.6	3.06	2.87	0.0	27.0	11	4.8	2.04	1.92	1.9	6.4	3
4/30/75	15:53:35	270.2	1.4	22.1	2.23	1.95	0.0	25.4	14	4.2	2.53	2.25	1.5	8.5	5
4/30/75	15:53:35	270.6	1.4	26.0	3.62	3.19	0.0	30.2	14	4.0	3.44	3.16	0.7	8.8	3
4/30/75	15:53:35	271.1	1.4	27.2	6.01	5.45	0.0	32.7	19	6.3	2.24	1.94	3.3	10.4	10
4/30/75	15:53:35	271.6	1.4	28.4	4.93	4.06	0.0	33.1	21	5.3	3.25	2.75	0.1	10.5	12
4/30/75	15:53:39	272.0	1.4	27.1	2.80	2.17	0.0	31.0	22	6.6	4.95	4.49	0.8	15.8	12
4/30/75	15:53:39	272.0	2.5	18.9	0.88	0.68	0.0	21.2	13	5.5	4.08	3.16	1.0	13.3	6
4/30/75	15:53:39	271.7	2.5	22.9	1.45	1.07	0.0	24.1	11	2.9	2.13	1.72	0.6	6.3	4
4/30/75	15:53:39	271.3	2.5	27.0	4.82	4.00	0.0	30.5	10	6.2	3.51	2.95	2.7	13.4	7
4/30/75	15:53:39	271.0	2.5	27.9	3.57	2.29	0.0	29.4	8	4.3	2.37	2.01	1.3	7.1	3
4/30/75	15:53:44	270.6	2.5	26.8	2.36	1.77	0.0	29.1	8	7.2	4.42	4.38	2.7	12.4	4
4/30/75	15:53:44	270.3	2.5	22.7	1.71	1.34	0.0	24.9	8	4.5	3.44	2.89	0.9	9.9	4
4/30/75	15:53:44	270.3	3.5	22.1	2.31	1.81	0.0	23.9	12	2.9	2.62	1.90	0.9	8.6	6
4/30/75	15:53:44	270.8	3.5	22.0	2.27	1.83	0.0	25.2	11	5.2	1.69	1.41	2.4	6.6	4
4/30/75	15:53:44	271.2	3.5	24.8	3.25	2.77	0.0	27.3	11	3.5	2.15	1.70	1.0	6.9	4
4/30/75	15:53:48	271.7	3.5	24.3	3.01	2.50	0.0	26.6	11	2.3	1.35	1.05	1.2	5.0	5
4/30/75	15:53:48	272.0	4.5	19.8	0.70	0.55	0.0	20.5	5	3.9	1.61	1.61	2.3	5.5	2
4/30/75	15:53:48	271.6	4.5	20.6	0.35	0.31	0.0	20.9	4	1.5	0.0	0.0	1.5	1.5	1
4/30/75	15:53:48	271.2	4.5	19.2	0.96	0.86	0.0	20.3	9	3.8	2.18	2.18	1.6	6.0	2
4/30/75	15:53:48	270.9	4.5	19.4	0.80	0.69	0.0	20.6	5	2.7	1.61	1.61	1.1	4.3	2
4/30/75	15:54: 3	270.6	4.5	21.3	0.93	0.79	0.0	21.9	3	6.2	0.0	0.0	6.2	6.2	1
4/30/75	15:54: 3	270.0	4.5	19.8	1.91	1.67	0.0	22.3	8	3.5	1.80	1.40	0.7	6.6	6
4/30/75	15:54: 3	270.9	0.4	28.9	3.88	3.53	0.0	32.2	7	4.2	3.43	3.24	0.8	9.0	4
4/30/75	15:54: 3	271.4	0.4	28.9	5.17	4.34	0.0	34.2	14	6.5	1.66	1.23	4.7	10.1	7
4/30/75	15:56:47	271.8	0.4	25.6	3.98	3.39	0.0	31.9	26	6.8	4.19	3.38	1.1	16.3	15
4/30/75	15:56:47	271.7	0.4	29.5	6.13	5.30	0.0	35.2	25	7.0	5.40	4.17	2.0	21.6	13
4/30/75	15:56:47	271.3	0.4	29.5	5.13	4.21	0.0	34.2	21	5.1	2.44	1.72	1.6	11.1	11
4/30/75	15:56:47	271.0	0.4	28.9	5.22	4.83	0.0	33.3	21	6.7	2.74	2.06	3.5	12.6	8
4/30/75	15:56:47	270.5	0.4	29.8	4.74	3.66	0.0	34.5	22	5.2	4.50	3.49	1.3	17.2	12
4/30/75	15:56:51	270.2	0.4	29.5	4.97	3.98	0.0	35.1	26	5.0	3.29	2.51	0.6	12.7	15
4/30/75	15:56:51	270.2	1.4	33.7	6.73	5.80	0.0	38.6	35	6.4	3.25	2.74	1.1	12.7	16
4/30/75	15:56:51	270.7	1.4	30.9	5.17	4.54	0.0	37.7	33	5.8	3.43	2.72	0.2	13.0	16
4/30/75	15:56:51	271.2	1.4	28.5	5.03	4.42	0.0	34.0	33	5.2	3.32	2.73	0.9	11.7	14
4/30/75	15:56:51	271.7	1.4	30.0	5.68	4.55	0.0	35.7	26	5.3	3.48	2.88	0.3	12.4	10
4/30/75	15:56:55	272.0	1.4	30.1	5.62	4.80	0.0	36.5	23	6.7	4.21	3.64	0.1	13.3	12
4/30/75	15:56:55	272.0	2.5	26.4	2.94	2.45	0.0	29.3	18	7.1	1.71	1.50	5.3	10.2	6
4/30/75	15:56:55	271.6	2.5	26.9	4.95	3.86	0.0	32.5	23	5.4	3.55	2.88	1.2	12.1	9
4/30/75	15:56:55	271.2	2.5	26.4	3.77	3.24	0.0	31.1	24	5.3	2.39	1.68	1.2	10.5	9
4/30/75	15:56:55	270.9	2.5	26.6	3.61	3.03	0.0	31.0	24	5.6	3.29	2.92	1.0	10.8	12
4/30/75	15:57: 0	270.5	2.5	26.9	5.70	4.75	0.0	31.9	31	4.2	3.30	2.69	0.5	11.0	12
4/30/75	15:57: 0	270.3	2.5	27.5	5.48	4.66	0.0	32.5	35	3.7	2.18	1.72	0.2	8.5	16
4/30/75	15:57: 0	270.0	2.5	28.5	5.50	4.44	0.0	33.3	38	4.8	2.37	1.91	0.9	9.8	19
4/30/75	15:57: 0	271.4	3.5	23.8	3.98	3.24	0.0	29.3	28	5.2	3.05	2.51	1.8	11.4	12
4/30/75	15:57: 0	271.8	3.5	25.6	3.62	3.11	0.0	29.0	22	5.9	3.85	3.41	0.4	10.7	8
4/30/75	15:57: 4	271.8	4.4	22.5	1.85	1.28	0.0	23.9	18	6.2	3.29	2.26	0.5	10.8	5
4/30/75	15:57: 4	271.4	4.4	22.8	2.12	1.61	0.0	24.9	19	3.4	1.97	1.85	0.8	6.6	9
4/30/75	15:57: 4	271.1	4.4	21.8	2.43	1.94	0.0	24.3	24	4.8	2.75	2.12	0.2	11.1	11
4/30/75	15:57: 4	270.8	4.4	22.1	2.13	1.79	0.0	25.0	26	4.8	2.17	1.87	1.4	8.0	11
4/30/75	15:57: 4	270.4	4.4	23.2	2.94	2.63	0.0	27.7	26	5.1	3.37	2.91	0.9	10.8	13
4/30/75	16: 0:24	270.7	0.4	32.6	4.69	4.06	0.0	36.7	27	6.5	2.68	2.04	2.5	13.1	13
4/30/75	16: 0:24	271.1	0.4	29.6	5.21	4.58	0.0	35.0	26	6.8	4.84	3.58	1.7	20.6	13
4/30/75	16: 0:24	271.6	0.4	29.6	6.27	5.26	0.0	35.0	26	4.8	3.12	2.51	0.3	12.2	16
4/30/75	16: 0:24	271.9	0.4	30.4	6.19	5.04	0.0	35.0	26	3.6	2.17	1.66	0.2	8.6	11
4/30/75	16: 0:24	270.3	0.4	32.3	4.28	3.31	0.0	35.9	52	6.0	2.65	2.03	1.4	12.6	30
4/30/75	16: 0:28	270.7	0.4	33.9	4.43	3.13	0.0	36.7	50	5.8	3.23	2.43	0.5	15.4	31
4/30/75	16: 0:28	271.1	0.4	34.2	5.98	4.30	0.0	38.1	53	6.7	4.39	3.11	1.7	23.2	30
4/30/75	16: 0:28	271.6	0.4	34.3	7.19	5.74	0.0	38.6	53	5.7	3.81	2.97	0.2	15.5	33
4/30/75	16: 0:28	272.0	0.4	34.5	6.30	5.08	0.0	39.2	46	5.7	3.78	3.11	0.9	16.8	28
4/30/75	16: 0:28	271.4	1.4	29.7	3.81	3.09	0.0	34.0	54	4.8	3.22	2.69	0.5	12.2	33
4/30/75	16: 0:32	271.0	1.4	28.8	3.54	2.94	0.0	33.2	55	5.0	2.72	2.21	0.2	11.6	34
4/30/75	16: 0:32	270.4	1.4	27.9	3.79	3.00	0.0	33.4	63	5.9	4.43	3.35	0.8	18.5	30
4/30/75	16: 0:32	270.0	1.4	29.2	5.56	4.87	0.0	36.4	65	6.0	3.83	2.93	0.8	17.7	36
4/30/75	16: 0:32	270.0	2.5	26.5	4.40	3.51	0.0	32.2	31	5.8	2.21	1.57	2.1	10.5	12
4/30/75	16: 0:32	270.6	2.5	26.4	4.30	3.51	0.0	31.2	36	4.0	2.12	1.82	0.4	8.0	21
4/30/75	16: 0:36	271.2	2.5	24.7	2.92	2.31	0.0	28.9	39	4.9	2.51	1.95	1.6	10.9	17
4/30/75	16: 0:36	271.8	2.5	24.0	3.05	2.64	0.0	27.8	48	5.1	3.27	2.56	0.9	13.2	22
4/30/75	16: 0:36	271.8	3.4	23.3	2.33	1.77	0.0	26.5	47	4.1	2.45	1.99	0.2	10.0	23
4/30/75	16: 0:36	271.3	3.4	21.7	2.64	2.28	0.0	26.5	47	4.3	2.70	1.95	0.3	11.1	19
4/30/75	16: 0:36	270.9	3.4	23.1	2.67	2.28	0.0	27.1	33	3.9	3.23	2.80	0.3	9.2	12
4/30/75	16: 0:56	270.0	3.4	23.1	2.16	1.73	0.0	25.5	23	5.6	3.28	2.73	1.2	10.7	7
4/30/75	16: 0:56	271.3	4.5	19.2	0.73	0.66	0.0	20.2	22	3.2	3.07	2.80	0.4	8.3	9
4/30/75	16: 0:56	271.8	4.5	19.5	1.34	1.06	0.0	22.3	24	5.0	3.12	2.89	0.6	10.1	9
4/30/75	16: 0:56	271.4	0.4	34.2	6.81	5.62	0.0	38.8	55	5.8	3.80	3.01	0.5	14.2	34
4/30/75	16: 3:21	271.0	0.4	34.0	6.11	4.99	0.0	38.6	51	6.1	4.10	3.46	0.2	15.1	29
4/30/75	16: 3:21	270.5	0.4	33.4	4.86	3.45	0.0	37.8	50	6.0	3.48	2.89	1.6	14.5	29
4/30/75	16: 3:21	270.1	0.4	31.9	4.25	3.36	0.0	36.6	52	5.3	3.43	2.35	0.4	19.0	31
4/30/75	16: 3:21	270.1	0.4	29.7	5.08	4.30	0.0	38.2	42	6.4	3.23	2.59	1.6	13.1	19
4/30/75	16: 3:21	270.5	0.4	31.4	6.64	5.94	0.0	38.2	48	5.9	4.02	3.20	0.2	17.4	26
4/30/75	16: 3:25	271.0	0.4	30.1	6.14	5.68	0.0	36.6	62	6.3	3.94	3.16	0.3	19.2	36
4/30/75	16: 3:25	271.4	0.4	30.3	5.56	5.02	0.0	36.5	57	5.8	3.64	2.70	0.3	18.2	31
4/30/75	16: 3:25	271.7	1.4	25.4	2.44	2.11	0.0	29.8	54	7.0	3.32	2.77	1.8	15.9	23
4/30/75	16: 3:25	271.2	1.4	25.9	3.96	3.30	0.0	32.0	64	5.8	3.49	2.90	0.7	12.9	35
4/30/75	16: 3:25	270.7	1.4	25.8	4.16	3.64	0.0	30.7	55	7.1	3.64	2.99	0.8	16.8	25
4/30/75	16: 3:33	270.3	1.4	27.2	5.11	4.41	0.0	32.7	53	6.5	4.47	4.14	0.6	15.5	24
4/30/75	16: 3:33	270.3	2.5	25.9	3.15	2.73	0.0	31.2	30	6.1	5.19	4.02	0.4	19.7	14
4/30/75	16: 3:33	270.9	2.5	23.0	2.12	1.84	0.0	26.0	29	2.9	1.20	0.95	0.1	4.2	9
4/30/75	16: 3:33	271.5	2.5	22.4	1.72	1.40	0.0	25.5	27	7.9	5.04	4.89	1.9	15.1	9
4/30/75	16: 3:33	271.6	3.4	20.1	1.19	0.98	0.0	21.7	19	5.3	4.07	3.67	0.1	10.6	5
4/30/75	16: 3:52	270.6	3.4	20.3	2.12	1.91	0.0	22.5	11	2.2	1.52	1.46	0.4	4.2	[illegible]
4/30/75	16: 3:52	272.0	4.5	18.2	0.59	0.47	0.0	18.7	12	4.0	0.0	0.0	4.0	4.0	1
4/30/75	16: 3:52	272.0	0.4	31.1	4.47	3.48	0.0	35.0	51	6.5	4.55	3.62	0.7	19.6	28
4/30/75	16: 3:52	271.5	0.4	30.9	3.91	3.14	0.0	34.8	51	6.0	5.49	4.07	0.7	22.0	28
4/30/75	16: 6:16	271.1	0.4	30.0	5.25	4.74	0.0	36.4	59	5.9	3.38	2.98	0.4	11.9	34
4/30/75	16: 6:16	270.6	0.4	30.0	6.30	5.58	0.0	36.6	61	6.4	4.15	3.64	0.3	14.2	30
4/30/75	16: 6:16	270.2	0.4	29.6	5.23	4.42	0.0	35.2	46	6.3	3.36	3.40	0.2	16.8	26
4/30/75	16: 6:16	[illegible]	0.4	[illegible]	[illegible]	[illegible]	0.0	[illegible]	27	5.9	[illegible]	[illegible]	[illegible]	[illegible]	27
4/30/75	16: 6:16	270.8	0.4	31.5	4.84	3.61	0.0	38.5	30	4.7	2.61	2.02	1.9	10.7	18
4/30/75	16: 6:20	270.9	0.4	30.5	4.87	3.71	0.0	34.3	36	5.0	3.07	2.58	2.9	12.4	15
4/30/75	16: 6:20	271.3	0.4	29.8	4.76	3.51	0.0	33.5	42	5.0	2.67	2.25	0.9	10.2	21
4/30/75	16: 6:20	271.8	1.4	28.1	3.25	2.09	0.0	30.7	40	5.0	4.31	3.68	0.3	19.1	21
4/30/75	16: 6:20	271.2	1.4	26.9	3.13	2.43	0.0	32.0	38	5.6	3.47	3.09	0.4	12.3	21
4/30/75	16: 6:20	270.7	1.4	28.4	2.73	1.99	0.0	31.4	31	5.1	3.59	2.87	0.2	12.3	19
4/30/75	16: 6:28	270.3	1.4	29.5	1.38	2.50	0.0	32.5	31	4.6	3.45	2.74	0.4	12.5	18
4/30/75	16: 6:28	270.3	2.5	28.8	5.57	4.75	0.0	33.0	15	8.2	4.93	3.73	3.5	18.6	6
4/30/75	16: 6:28	271.0	2.5	26.0	3.58	3.07	0.0	30.6	15	3.6	3.55	3.09	0.3	10.7	7
4/30/75	16: 6:47	271.0	3.4	18.6	0.92	0.71	0.0	19.2	4	2.5	0.0	0.0	2.5	2.5	1
4/30/75	16: 6:47	270.5	3.4	21.1	1.66	1.40	0.0	23.7	15	4.6	2.41	2.13	1.4	8.4	6

3-BIN 4/30/75 REFLECTIVITY (10 log Z) LIQUID WATER CONTENT (g/m^3)

				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	16: 6:47	271.9	0.4	27.0	4.17	3.45	0.0	31.5	56	5.9	3.29	2.55	0.3	12.7	27
4/30/75	16: 9: 8	271.4	0.4	28.4	2.75	2.13	0.0	30.8	40	5.7	3.44	2.96	1.1	13.3	21
4/30/75	16: 9: 8	270.4	0.4	31.5	5.36	3.68	0.0	35.2	34	5.7	3.30	2.65	0.7	14.2	18
4/30/75	16: 9: 8	270.1	0.4	29.1	3.88	3.36	0.0	33.4	28	7.3	4.48	3.52	1.2	16.2	12
4/30/75	16: 9: 8	270.5	0.4	29.0	4.87	4.16	0.0	33.4	28	7.0	3.79	2.90	1.3	14.7	14
4/30/75	16: 9: 8	271.5	0.4	30.4	5.35	4.81	0.0	36.9	35	6.8	2.47	2.04	1.7	11.1	15
4/30/75	16: 9:15	271.9	0.4	28.7	4.39	3.84	0.0	33.5	40	7.4	3.91	3.47	2.5	14.7	19
4/30/75	16: 9:15	271.6	1.4	25.1	3.37	2.83	0.0	29.6	37	6.1	3.89	3.37	0.1	13.7	14
4/30/75	16: 9:15	271.1	1.4	26.7	2.80	2.10	0.0	30.6	34	6.1	4.90	3.73	0.8	18.8	13
4/30/75	16: 9:15	270.6	1.4	29.6	4.14	3.28	0.0	33.9	33	5.5	3.04	2.82	0.8	9.8	15
4/30/75	16: 9:15	270.1	2.5	22.9	2.91	2.45	0.0	27.5	37	4.2	2.68	2.30	0.4	8.9	17
4/30/75	16: 9:19	270.6	2.5	25.3	4.15	3.50	0.0	31.6	28	6.3	3.20	2.54	3.1	14.6	12
4/30/75	16: 9:19	271.3	2.5	23.9	2.23	1.95	0.0	27.1	23	5.1	3.03	2.40	1.2	12.1	10
4/30/75	16: 9:19	271.8	2.5	21.2	1.82	1.48	0.0	23.6	13	8.8	2.65	2.65	6.1	11.4	2
4/30/75	16: 9:38	270.2	3.4	19.3	0.63	0.43	0.0	20.2	8	5.2	1.85	1.74	3.7	7.8	3
4/30/75	16: 9:38	271.8	0.4	26.0	3.33	2.88	0.0	30.7	44	5.8	3.03	2.44	0.5	11.9	22
4/30/75	16:11:59	271.3	0.4	29.4	4.69	3.92	0.0	34.0	34	4.9	2.87	2.18	0.3	12.9	19
4/30/75	16:11:59	270.8	0.4	29.8	4.24	3.65	0.0	34.2	31	6.5	3.97	3.37	0.7	13.4	15
4/30/75	16:11:59	270.3	0.4	29.9	3.91	3.03	0.0	34.2	30	6.4	4.07	3.61	0.4	14.3	14
4/30/75	16:11:59	270.1	0.4	27.1	3.14	2.81	0.0	31.5	43	6.8	3.49	2.78	2.2	14.5	19
4/30/75	16:11:59	270.5	0.4	26.9	3.06	2.39	0.0	30.5	48	6.4	2.92	2.23	1.3	13.2	25
4/30/75	16:12: 3	271.0	0.4	26.9	3.77	3.14	0.0	32.0	44	5.0	3.00	2.53	0.2	9.8	21
4/30/75	16:12: 3	271.8	0.4	29.0	3.52	3.11	0.0	32.7	30	5.9	3.22	2.84	0.3	10.5	13
4/30/75	16:12: 3	271.5	1.4	26.0	2.93	2.37	0.0	30.1	37	6.8	2.95	2.35	1.7	12.1	17
4/30/75	16:12: 3	271.1	1.4	26.4	1.87	1.55	0.0	29.9	44	5.8	3.40	2.64	0.6	14.2	21
4/30/75	16:12: 3	270.5	1.4	25.3	3.04	2.43	0.0	29.9	52	6.6	3.40	2.37	0.6	12.2	31
4/30/75	16:12:11	270.2	2.4	24.9	3.09	2.56	0.0	29.3	51	5.9	3.79	3.35	0.5	11.8	23
4/30/75	16:12:11	270.8	2.4	24.8	2.87	2.39	0.0	29.0	60	5.3	2.73	2.28	0.2	11.6	35
4/30/75	16:12:11	271.4	2.4	23.5	2.72	2.21	0.0	26.9	48	6.5	4.05	3.06	0.9	18.9	21
4/30/75	16:12:11	271.9	2.4	23.4	2.49	2.19	0.0	26.9	27	4.2	2.99	2.36	0.4	12.1	16
4/30/75	16:12:15	271.1	3.4	22.1	2.14	1.92	0.0	26.0	16	3.4	1.61	1.45	1.5	5.7	5
4/30/75	16:12:15	270.6	3.4	22.2	1.97	1.75	0.0	25.0	34	4.4	3.94	3.35	0.4	13.0	14
4/30/75	16:12:15	270.2	3.4	22.9	1.85	1.48	0.0	25.3	36	4.2	2.12	1.97	0.8	7.4	17
4/30/75	16:12:15	270.5	4.4	21.9	3.18	2.85	0.0	25.7	32	3.2	1.45	1.16	0.2	5.2	14
4/30/75	16:12:15	271.1	4.4	22.5	2.15	1.80	0.0	24.7	30	4.0	1.67	1.37	0.8	6.8	14
4/30/75	16:14:55	271.7	4.4	20.7	1.63	1.39	0.0	23.0	23	4.5	3.41	2.57	0.5	12.3	10
4/30/75	16:14:55	271.7	0.3	28.8	4.19	3.65	0.0	33.2	35	6.9	4.51	3.34	0.4	18.4	17
4/30/75	16:14:55	271.1	0.3	28.4	3.96	3.42	0.0	33.7	39	5.1	3.07	2.47	0.5	13.5	24
4/30/75	16:14:55	270.2	0.3	27.1	2.98	2.31	0.0	30.5	42	5.8	4.34	3.19	0.3	19.9	20
4/30/75	16:14:55	270.3	0.4	27.2	3.54	3.14	0.0	32.0	42	5.1	3.69	3.08	0.4	13.1	22
4/30/75	16:14:59	270.7	0.4	27.7	3.03	2.38	0.0	32.4	52	5.2	3.27	2.60	1.0	14.4	28
4/30/75	16:14:59	271.1	0.4	27.6	2.90	2.22	0.0	31.9	53	5.9	3.97	3.27	0.2	14.9	29
4/30/75	16:14:59	271.9	0.4	28.0	3.96	3.01	0.0	32.2	53	5.9	5.15	3.87	1.4	22.1	24
4/30/75	16:14:59	272.0	1.4	27.0	3.70	3.07	0.0	32.3	53	6.5	3.91	3.40	0.7	13.5	24
4/30/75	16:14:59	271.5	1.4	28.5	4.63	3.62	0.0	34.0	58	6.0	3.46	2.52	0.4	17.4	28
4/30/75	16:15: 3	271.1	1.4	28.5	4.61	3.77	0.0	33.3	57	4.9	3.31	2.61	0.4	14.4	31
4/30/75	16:15: 3	270.6	1.4	28.8	4.42	3.72	0.0	32.9	48	5.2	3.45	2.66	0.1	15.4	23
4/30/75	16:15: 3	270.3	1.4	28.0	5.02	4.44	0.0	33.5	43	5.3	3.70	2.83	0.7	16.6	21
4/30/75	16:15: 3	270.2	2.4	27.7	3.86	3.02	0.0	31.5	20	3.9	3.02	2.65	0.1	9.5	10
4/30/75	16:15: 3	270.7	2.4	27.5	4.86	4.13	0.0	32.1	29	6.3	4.32	3.40	0.1	15.7	10
4/30/75	16:15: 8	271.2	2.4	27.6	4.41	3.51	0.0	31.3	38	5.3	3.53	2.73	0.4	15.5	21
4/30/75	16:15: 8	271.8	2.4	27.2	4.61	3.99	0.0	32.2	52	4.7	3.68	2.98	3.4	16.2	27
4/30/75	16:15: 8	270.9	3.4	22.4	1.52	1.27	0.0	25.5	35	4.6	2.33	1.94	1.9	9.5	16
4/30/75	16:15: 8	270.5	3.4	22.8	1.70	1.48	0.0	25.2	19	3.0	2.04	1.84	0.6	6.4	6
4/30/75	16:15: 8	270.1	3.4	22.1	2.50	1.99	0.0	24.8	12	3.5	2.34	1.91	0.9	7.4	5
4/30/75	16:15:27	270.5	4.4	20.1	1.36	1.17	0.0	21.2	11	3.3	1.48	1.48	1.8	4.8	2
4/30/75	16:15:27	271.6	4.4	21.4	1.57	1.31	0.0	23.2	24	4.2	3.31	2.24	0.9	11.5	8
4/30/75	16:15:27	271.7	0.3	27.6	3.98	2.93	0.0	30.9	50	5.6	3.90	3.29	0.0	15.6	22
4/30/75	16:15:27	271.2	0.3	28.2	3.52	2.94	0.0	33.4	49	5.5	3.45	2.82	0.5	13.6	27
4/30/75	16:17:57	270.5	0.3	27.6	3.31	2.69	0.0	32.5	42	4.1	2.75	2.14	0.1	12.0	30
4/30/75	16:17:57	270.0	0.4	26.7	3.90	3.38	0.0	31.8	35	7.5	2.82	2.31	2.4	13.0	16
4/30/75	16:17:57	270.4	0.4	25.4	2.88	2.61	0.0	29.7	31	5.5	2.78	2.09	0.9	12.8	16
4/30/75	16:17:57	270.8	0.4	26.7	3.24	2.85	0.0	31.0	29	4.5	2.78	2.14	0.8	11.6	14
4/30/75	16:18: 2	271.3	0.4	28.1	3.47	2.76	0.0	32.0	23	4.4	2.42	1.97	0.5	10.0	13
4/30/75	16:18: 2	271.7	0.4	28.5	4.67	3.80	0.0	33.5	31	5.8	3.37	3.00	0.6	11.0	16
4/30/75	16:18: 2	271.4	1.4	27.5	4.11	3.54	0.0	31.7	31	4.5	3.33	3.04	0.2	9.1	15
4/30/75	16:18: 2	271.1	1.4	26.8	4.11	3.42	0.0	31.2	31	4.3	2.69	2.09	1.0	11.0	15
4/30/75	16:18: 2	270.6	1.4	27.7	2.86	2.47	0.0	31.6	27	6.7	3.35	2.65	1.5	14.2	11
4/30/75	16:18: 6	270.2	1.4	27.5	2.44	2.22	0.0	31.2	26	4.4	2.64	2.20	0.6	9.5	12
4/30/75	16:18: 6	270.3	2.4	27.3	4.63	4.06	0.0	32.0	16	10.0	7.07	5.91	3.6	21.8	4
4/30/75	16:18: 6	270.9	2.4	26.4	3.86	3.04	0.0	30.9	23	5.9	3.68	3.36	0.6	10.7	11
4/30/75	16:18: 6	271.4	2.4	24.3	3.32	2.78	0.0	28.5	30	5.1	2.73	2.27	1.8	10.7	12
4/30/75	16:18: 6	271.9	2.4	24.6	3.29	2.73	0.0	28.8	28	5.9	3.61	3.21	1.8	12.7	11
4/30/75	16:18:10	271.6	3.4	21.9	1.70	1.53	0.0	24.3	14	4.1	2.60	2.34	0.9	7.8	4
4/30/75	16:18:10	271.1	3.4	22.8	2.06	1.67	0.0	27.4	25	5.6	3.48	2.93	1.4	12.2	7
4/30/75	16:18:10	270.7	3.4	23.0	3.83	3.44	0.0	29.0	20	5.1	3.11	2.55	0.8	10.9	9
4/30/75	16:18:10	270.3	3.4	24.7	4.21	3.72	0.0	31.1	15	7.7	4.58	4.03	2.8	16.0	6
4/30/75	16:18:10	270.0	3.4	27.4	3.45	3.14	0.0	30.3	8	4.9	1.81	1.81	3.1	6.7	2
4/30/75	16:18:30	271.3	4.4	18.9	1.43	1.29	0.0	20.9	7	6.0	0.48	0.41	5.4	6.6	3
4/30/75	16:18:30	271.8	4.4	19.3	1.08	0.85	0.0	20.6	11	5.5	2.00	1.76	3.1	8.5	4
4/30/75	16:18:30	271.8	0.3	28.9	3.73	3.29	0.0	32.7	36	4.6	2.99	2.54	0.1	10.5	20
4/30/75	16:21: 0	271.4	0.3	28.5	2.94	2.34	0.0	31.2	26	5.7	2.90	2.49	1.5	10.6	13
4/30/75	16:21: 0	271.0	0.3	27.3	3.75	3.24	0.0	31.2	30	5.7	2.81	2.16	1.5	12.9	15
4/30/75	16:21: 0	270.6	0.3	27.6	3.90	3.35	0.0	32.0	28	4.2	2.94	2.53	0.3	10.2	13
4/30/75	16:21: 0	270.2	0.3	27.3	2.23	1.98	0.0	31.1	24	4.9	2.80	2.45	0.9	9.6	10
4/30/75	16:21: 0	270.2	0.4	25.7	2.70	2.25	0.0	29.5	30	4.9	3.97	3.23	0.9	12.9	12
4/30/75	16:21: 4	270.6	0.4	25.5	2.79	2.38	0.0	28.3	27	6.4	3.72	3.18	1.5	12.6	10
4/30/75	16:21: 4	271.1	0.4	25.3	3.84	3.53	0.0	30.4	30	5.9	3.77	3.59	1.0	10.9	12
4/30/75	16:21: 4	271.4	0.4	26.1	4.76	4.43	0.0	32.3	31	5.2	3.24	2.95	1.2	11.6	15
4/30/75	16:21: 4	271.8	0.4	26.8	4.56	4.09	0.0	32.7	28	7.7	5.37	3.95	1.5	22.6	13
4/30/75	16:21: 4	271.7	1.4	28.2	6.10	5.63	0.0	33.1	20	7.8	6.10	4.70	1.4	21.5	8
4/30/75	16:21: 8	271.2	1.4	26.1	4.31	3.87	0.0	29.7	14	6.9	3.89	3.89	3.0	10.8	2
4/30/75	16:21: 8	270.8	1.4	24.1	2.29	1.91	0.0	26.7	25	7.3	3.92	3.24	1.5	12.8	6
4/30/75	16:21: 8	270.4	1.4	24.6	2.17	1.79	0.0	27.5	30	6.4	3.99	3.59	1.4	14.0	12
4/30/75	16:21: 8	270.0	1.4	23.7	2.56	2.04	0.0	26.9	35	6.8	5.60	5.08	1.0	17.4	13
4/30/75	16:21: 8	270.0	2.5	21.4	1.70	1.32	0.0	23.6	11	6.5	1.53	1.45	5.0	8.8	5
4/30/75	16:21:12	270.5	2.5	24.8	3.49	3.04	0.0	29.0	22	7.3	5.10	4.12	1.0	18.0	8
4/30/75	16:21:12	271.1	2.5	24.3	4.20	3.65	0.0	31.2	31	6.9	5.21	4.71	1.4	17.4	11
4/30/75	16:21:12	271.6	2.5	24.2	3.29	2.97	0.0	28.7	19	8.8	3.63	3.24	4.2	13.9	4
4/30/75	16:21:12	271.9	3.4	20.4	0.50	0.40	0.0	21.1	6	0.2	0.0	0.0	0.2	0.2	1
4/30/75	16:21:17	271.1	3.4	20.2	1.12	0.83	0.0	21.4	8	2.9	1.79	1.66	1.4	5.4	3
4/30/75	16:24: 3	271.8	0.4	25.2	2.84	2.28	0.0	28.7	25	4.4	2.26	1.93	2.3	8.8	11
4/30/75	16:24: 3	271.1	0.4	26.4	3.96	3.59	0.0	31.8	26	4.3	3.41	2.82	0.2	12.3	13
4/30/75	16:24: 3	270.6	0.4	27.2	4.00	3.41	0.0	30.8	28	5.0	3.87	3.27	0.5	12.6	12
4/30/75	16:24: 3	270.3	0.4	26.0	3.39	2.91	0.0	30.5	32	5.8	2.30	1.74	0.0	9.7	14
4/30/75	16:24: 7	270.5	0.4	19.9	1.26	1.09	0.0	21.5	8	6.1	2.55	2.37	3.8	9.7	3
4/30/75	16:24: 7	271.0	0.4	23.3	1.87	1.66	0.0	26.1	21	4.8	3.57	2.67	0.1	11.8	9
4/30/75	16:24: 7	271.8	0.4	24.7	2.86	2.61	0.0	27.7	35	5.0	2.56	2.08	0.7	9.9	15
4/30/75	16:24: 7	271.8	1.4	25.4	2.26	1.97	0.0	27.9	16	3.5	1.78	1.59	1.4	6.1	5
4/30/75	16:24: 7	271.3	1.4	22.4	3.50	3.18	0.0	27.5	29	7.3	5.47	4.57	1.2	16.7	14
4/30/75	16:24:15	270.9	1.4	24.5	2.17	1.79	0.0	27.3	13	3.7	1.95	1.52	0.1	6.7	7
4/30/75	16:24:15	271.1	2.5	26.3	2.65	2.05	0.0	28.7	14	4.4	2.65	1.95	0.5	7.9	4

3-BIN 4/30/75				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
4/30/75	16:24:15	271.6	2.5	26.6	1.77	1.45	0.0	28.4	10	3.8	3.33	2.80	0.8	9.2	4
4/30/75	16:24:15	271.8	3.4	24.2	1.96	1.56	0.0	26.0	6	3.7	2.03	1.91	0.8	5.4	3
4/30/75	16:24:20	270.6	3.4	23.8	1.85	1.63	0.0	25.7	8	1.4	0.0	0.0	1.4	1.4	1
4/30/75	16:24:35	271.9	0.4	23.8	3.34	2.99	0.0	28.2	36	5.9	3.85	2.98	0.4	15.8	18
4/30/75	16:24:35	271.5	0.4	24.3	3.00	2.55	0.0	28.0	32	4.2	3.34	2.69	0.2	12.2	15
4/30/75	16:24:35	271.1	0.4	23.7	3.10	2.93	0.0	27.5	27	5.7	4.75	3.51	0.5	18.5	14
4/30/75	16:24:35	270.6	0.4	22.4	3.21	2.73	0.0	24.8	14	9.9	7.18	6.65	3.3	19.9	3
4/30/75	16:27: 8	272.0	0.4	23.5	1.49	1.16	0.0	24.5	8	9.7	3.37	3.18	5.1	13.6	4
4/30/75	16:27:12	270.0	1.4	20.5	1.20	1.09	0.0	22.2	11	3.6	1.68	1.43	1.3	6.1	6
4/30/75	16:27:16	271.8	2.5	23.4	1.09	0.88	0.0	24.4	7	6.8	0.0	0.0	6.8	6.8	1
4/30/75	16:27:20	270.2	3.4	18.9	0.86	0.76	0.0	19.7	3	5.1	0.0	0.0	5.1	5.1	1
4/30/75	16:29:59	271.8	0.3	22.7	0.54	0.44	0.0	23.2	8	9.0	0.0	0.0	9.0	9.0	1
4/30/75	16:29:59	270.0	0.4	22.6	3.02	2.76	0.0	26.5	26	7.6	3.57	3.27	2.6	12.5	9
4/30/75	16:30: 3	270.4	0.4	25.6	3.10	2.76	0.0	29.1	23	8.4	6.93	5.76	2.4	23.8	12
4/30/75	16:30: 3	270.8	0.4	26.7	3.00	2.30	0.0	28.9	20	6.2	4.27	3.62	0.4	14.5	10
4/30/75	16:30: 3	271.2	0.4	25.2	2.07	1.87	0.0	28.1	14	7.5	4.26	3.42	0.8	14.3	6
4/30/75	16:30: 3	271.6	1.4	21.0	1.52	1.35	0.0	22.8	4	1.5	0.0	0.0	1.5	1.5	1
4/30/75	16:30: 3	271.1	1.4	23.1	1.02	0.87	0.0	24.3	16	5.3	2.03	1.55	1.8	8.8	7
4/30/75	16:30: 7	270.6	1.4	24.9	2.22	1.84	0.0	28.5	25	6.5	2.35	2.18	3.5	10.1	10
4/30/75	16:30: 7	270.2	1.4	23.8	2.29	1.93	0.0	26.1	19	3.7	1.28	1.11	1.9	5.7	8
4/30/75	16:30: 7	270.0	2.5	19.2	1.45	1.32	0.0	20.3	6	8.9	0.0	0.0	8.9	8.9	1
4/30/75	16:30: 7	270.6	2.5	18.6	0.86	0.66	0.0	19.4	6	3.7	0.0	0.0	3.7	3.7	1
4/30/75	16:30: 7	271.1	2.5	20.5	1.64	1.43	0.0	22.3	18	7.9	2.37	1.81	5.1	12.5	6
4/30/75	16:30:14	271.8	0.2	19.9	0.35	0.25	0.0	20.1	3	4.5	3.05	3.05	1.4	7.5	2
4/30/75	16:30:14	270.6	0.3	24.0	2.52	1.92	0.0	26.5	20	5.9	2.99	2.31	1.7	11.6	9
4/30/75	16:30:14	270.0	0.4	26.2	3.49	2.76	0.0	30.0	21	6.9	4.62	4.07	1.0	14.9	8
4/30/75	16:32:45	271.9	1.4	24.6	2.18	1.77	0.0	27.2	18	5.3	4.14	3.15	0.3	14.5	8
4/30/75	16:32:45	271.4	1.4	22.2	1.78	1.36	0.0	24.8	22	5.2	3.28	2.93	0.4	10.0	8
4/30/75	16:32:45	271.0	1.4	21.7	2.10	1.72	0.0	24.6	14	5.0	3.12	2.81	0.9	9.2	4
4/30/75	16:32:45	270.5	1.4	20.1	1.13	0.86	0.0	21.2	10	2.6	2.25	1.64	0.4	7.4	6
4/30/75	16:32:53	271.6	2.5	18.5	1.00	0.94	0.0	19.5	5	3.4	1.48	1.24	1.6	5.2	3
4/30/75	16:33:13	272.0	0.4	24.2	2.71	2.22	0.0	27.3	21	6.3	4.47	3.58	0.2	15.4	9
4/30/75	16:33:13	271.1	0.3	22.8	1.93	1.55	0.0	25.5	24	4.4	2.15	1.89	0.9	7.8	11
4/30/75	16:33:13	270.7	0.3	22.1	1.72	1.44	0.0	24.9	14	3.6	0.0	0.0	3.6	3.6	1
4/30/75	16:33:13	270.3	0.3	21.2	1.77	1.46	0.0	23.1	10	7.8	2.96	2.96	4.8	10.7	2
4/30/75	16:36:19	272.0	0.4	19.9	1.60	1.39	0.0	21.7	14	9.7	2.82	2.69	5.8	12.5	4
4/30/75	16:42:17	270.6	1.4	23.2	1.57	1.54	0.0	24.4	2	13.2	0.0	0.0	13.2	13.2	1
4/30/75	16:42:22	270.0	1.4	25.2	1.92	1.79	0.0	26.7	6	5.7	0.0	0.0	5.7	5.7	1
4/30/75	16:42:22	271.4	2.5	20.2	1.29	1.12	0.0	21.9	8	7.6	0.0	0.0	7.6	7.6	1
4/30/75	16:42:26	271.5	3.4	21.3	1.10	1.04	0.0	22.7	5	1.8	0.0	0.0	1.8	1.8	1
4/30/75	16:42:26	271.1	3.4	24.4	0.54	0.40	0.0	24.9	6	1.3	1.20	1.20	0.1	2.5	2
4/30/75	16:42:26	270.8	3.4	24.5	0.73	0.65	0.0	25.2	5	2.2	1.71	1.71	0.5	3.9	2
4/30/75	16:45:30	271.7	1.4	20.3	0.92	0.84	0.0	21.7	5	2.9	1.83	1.71	0.4	4.6	3
4/30/75	16:45:40	271.3	2.5	27.3	4.16	3.85	0.0	30.4	8	12.9	5.27	5.27	7.6	18.2	2
4/30/75	16:45:40	271.2	3.4	21.2	1.17	1.14	0.0	22.0	2	4.1	0.0	0.0	4.1	4.1	1
4/30/75	16:45:43	270.9	3.4	25.9	1.44	1.20	0.0	27.4	6	4.1	0.0	0.0	4.1	4.1	1
4/30/75	16:45:43	270.5	3.4	27.9	3.07	2.61	0.0	30.5	8	9.2	1.96	1.96	7.2	11.1	2
4/30/75	16:45:43	270.2	3.4	28.5	3.09	2.27	0.0	30.7	7	2.9	0.0	0.0	2.9	2.9	1
4/30/75	16:45:59	271.6	0.4	24.4	1.00	0.99	0.0	25.6	3	4.8	0.0	0.0	4.8	4.8	1
4/30/75	16:48:20	271.2	0.4	23.3	0.22	0.17	0.0	23.4	3	1.2	0.76	0.76	0.5	2.0	2
4/30/75	16:48:20	270.2	0.4	22.8	1.00	0.90	0.0	23.7	4	7.1	0.0	0.0	7.1	7.1	1
4/30/75	16:48:24	271.4	0.4	25.0	2.95	2.67	0.0	28.0	11	10.0	4.96	4.83	4.0	16.0	4
4/30/75	16:48:24	271.8	0.4	26.0	2.69	2.37	0.0	28.7	10	8.4	6.50	5.51	2.8	19.5	3
4/30/75	16:48:24	271.5	1.4	29.5	3.22	2.56	0.0	32.3	10	5.8	3.51	3.20	1.0	9.3	3
4/30/75	16:48:24	271.1	1.4	28.0	1.78	1.42	0.0	29.9	9	1.7	1.05	0.94	0.6	3.1	3
4/30/75	16:48:24	271.1	1.4	28.3	2.14	1.76	0.0	30.4	6	5.1	2.70	2.70	2.4	7.8	2
4/30/75	16:48:24	270.7	1.4	26.8	2.70	2.18	0.0	28.4	5	4.9	0.0	0.0	4.9	4.9	1
4/30/75	16:48:33	270.4	2.5	25.1	2.63	2.29	0.0	28.4	11	13.8	0.0	0.0	13.8	13.8	1
4/30/75	16:48:33	270.9	2.5	25.9	3.08	2.81	0.0	29.7	16	5.5	5.24	4.14	1.6	16.5	6
4/30/75	16:48:33	271.4	2.5	28.8	5.59	4.74	0.0	33.2	14	6.8	3.57	3.16	1.6	11.2	4
4/30/75	16:48:33	271.8	2.5	29.6	1.61	1.46	0.0	31.7	11	4.8	1.73	1.73	3.1	6.5	2
4/30/75	16:48:33	271.7	3.4	24.9	1.72	1.39	0.0	27.0	11	2.5	1.54	1.54	0.9	4.0	2
4/30/75	16:48:37	271.3	3.5	22.8	1.14	0.96	0.0	24.1	8	4.6	0.0	0.0	4.6	4.6	1
4/30/75	16:48:37	271.0	3.4	25.3	0.93	0.87	0.0	26.1	4	6.2	0.0	0.0	6.2	6.2	1
4/30/75	16:48:37	270.5	3.4	25.9	0.94	0.82	0.0	27.1	5	2.6	0.93	0.93	1.7	3.5	2
4/30/75	16:48:37	270.3	3.4	25.8	2.45	1.85	0.0	27.9	6	4.7	2.44	2.44	2.3	7.1	2
4/30/75	16:48:37	270.1	4.5	26.0	3.85	3.33	0.0	29.4	6	0.9	0.73	0.73	0.2	1.6	2
4/30/75	16:48:54	271.1	0.4	27.7	2.40	1.92	0.0	29.7	9	1.6	0.0	0.0	1.6	1.6	1

2-BIN 5/30/75				REFLECTIVITY (10 log Z)						LIQUID WATER CONTENT (g/m^3)					
DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
5/30/75	14:54:25	270.5	2.4	20.0	0.69	0.63	0.0	20.6	4	6.4	2.12	2.12	4.3	8.5	2
5/30/75	14:54:25	271.8	3.4	22.7	2.31	1.87	0.0	25.2	18	5.9	3.24	2.70	0.7	11.0	9
5/30/75	14:54:25	270.1	3.4	24.6	3.49	2.73	0.0	28.5	12	5.7	3.45	3.05	0.5	11.2	8
5/30/75	14:54:25	270.9	4.5	21.6	2.60	2.28	0.0	25.1	18	5.6	2.55	2.30	2.0	9.8	9
5/30/75	14:54:25	271.8	4.5	27.6	4.57	3.82	0.0	33.9	25	6.2	3.43	2.72	1.0	13.1	11
5/30/75	14:57:35	271.8	3.5	20.9	3.89	2.61	0.0	28.2	12	7.9	4.89	4.63	2.0	15.5	7
5/30/75	14:57:35	270.9	3.5	20.1	1.85	1.64	0.0	22.5	7	7.9	4.33	4.18	3.7	13.7	5
5/30/75	14:57:35	270.0	3.5	20.1	0.85	0.69	0.0	20.9	4	6.3	5.30	4.90	1.3	13.6	3
5/30/75	14:59:55	270.2	4.5	18.8	0.85	0.68	0.0	19.4	6	4.0	1.57	1.28	2.1	5.9	3
5/30/75	15: 0:31	271.9	1.4	26.1	0.84	0.83	0.0	26.8	2	8.5	0.0	0.0	8.5	8.5	1
5/30/75	15: 3:16	270.0	3.5	21.9	1.68	1.64	0.0	23.1	2	17.1	0.0	0.0	17.1	17.1	1
5/30/75	15:23:59	270.7	0.4	27.4	1.35	0.90	0.0	28.5	10	9.4	3.85	2.76	4.1	15.0	4
5/30/75	15:23:59	271.6	0.4	31.4	1.64	1.32	0.0	34.1	15	6.2	3.59	2.92	0.7	13.4	10
5/30/75	15:23:59	270.6	1.4	20.5	0.32	0.27	0.0	20.6	7	5.1	2.38	1.95	2.2	8.0	3
5/30/75	15:23:59	270.5	2.5	29.8	3.00	2.52	0.0	33.2	18	6.5	3.60	2.76	1.8	15.0	10
5/30/75	15:25:53	270.4	3.4	25.7	2.39	2.06	0.0	28.2	10	6.3	4.72	3.65	1.8	16.7	7
5/30/75	15:25:53	270.0	0.4	28.7	2.79	2.24	0.0	31.1	19	5.4	2.68	2.41	1.6	9.0	9
5/30/75	15:25:53	270.9	0.4	31.3	5.58	4.20	0.0	35.4	16	7.8	4.67	3.69	2.9	18.3	10
5/30/75	15:27:27	271.6	0.4	29.4	3.04	2.32	0.0	32.2	19	7.1	4.37	3.76	2.0	14.2	9
5/30/75	15:27:27	272.0	1.5	28.4	4.23	3.34	0.0	33.6	37	6.2	2.78	2.17	0.9	12.4	24
5/30/75	15:27:27	270.5	1.4	26.7	3.90	2.81	0.0	30.7	36	6.2	3.94	3.19	0.8	17.1	24
5/30/75	15:27:27	270.5	2.5	29.0	3.13	2.63	0.0	32.8	33	7.4	4.47	3.90	0.3	16.6	14
5/30/75	15:27:27	271.3	2.5	27.4	2.30	1.90	0.0	30.6	29	5.2	2.85	2.46	0.5	11.0	16
5/30/75	15:28: 9	270.9	3.5	23.3	2.21	1.88	0.0	27.2	28	6.4	4.64	3.88	0.6	17.2	15
5/30/75	15:28: 9	271.2	3.5	22.9	2.43	1.92	0.0	27.7	31	6.9	3.89	2.80	2.5	16.5	11
5/30/75	15:28: 9	270.5	3.4	23.7	1.80	1.37	0.0	25.8	28	5.1	2.71	2.20	0.5	9.8	15
5/30/75	15:28: 9	270.4	4.5	21.7	1.63	1.23	0.0	22.8	10	5.0	2.07	1.63	2.5	8.2	4
5/30/75	15:28: 9	271.8	4.5	24.2	3.56	2.99	0.0	27.6	23	3.7	2.49	1.91	0.5	9.8	11
5/30/75	15:30:53	270.0	0.4	26.7	3.08	2.58	0.0	30.5	37	5.8	3.74	3.01	0.8	16.1	22
5/30/75	15:30:53	270.9	0.4	27.3	2.51	2.10	0.0	30.2	31	7.5	3.12	2.61	2.3	12.7	12
5/30/75	15:30:53	271.7	0.4	27.5	3.44	2.89	0.0	31.9	35	5.8	3.20	2.42	2.0	16.0	21
5/30/75	15:30:53	271.2	0.4	27.2	2.75	2.09	0.0	30.5	36	7.9	4.00	3.35	2.0	15.3	16
5/30/75	15:30:53	271.9	1.4	27.3	3.26	2.67	0.0	30.0	31	7.2	4.40	3.54	1.2	17.8	23
5/30/75	15:31:30	271.1	1.4	24.7	3.33	2.96	0.0	29.7	30	9.3	4.11	3.52	1.4	15.4	20
5/30/75	15:31:30	270.2	2.5	21.3	2.19	1.81	0.0	24.7	23	7.7	4.47	3.75	2.2	16.3	13
5/30/75	15:31:30	271.1	2.5	22.7	2.67	2.05	0.0	27.0	22	8.6	4.83	4.02	2.6	17.5	13
5/30/75	15:31:30	271.9	3.4	26.1	5.10	4.10	0.0	30.0	10	7.5	2.38	2.17	3.5	10.0	7
5/30/75	15:31:30	271.1	3.4	19.6	1.56	1.34	0.0	21.2	5	8.5	5.17	5.17	3.3	13.7	2
5/30/75	15:33:50	270.5	4.5	18.7	1.78	1.61	0.0	20.5	6	13.7	2.06	1.70	11.2	16.3	3
5/30/75	15:33:50	270.0	0.4	23.6	2.65	2.32	0.0	27.7	33	6.6	3.20	2.74	1.0	11.6	15
5/30/75	15:33:50	270.9	0.4	24.4	3.25	2.92	0.0	28.1	24	7.3	4.24	3.55	1.0	15.8	15
5/30/75	15:33:50	270.7	0.4	24.6	2.18	1.76	0.0	28.1	39	6.6	3.35	2.62	1.2	14.5	19
5/30/75	15:34:51	271.6	0.4	23.6	1.13	1.57	0.0	27.2	32	5.5	1.97	1.67	2.0	8.7	18
5/30/75	15:34:51	270.6	1.4	25.2	4.31	3.69	0.0	31.5	68	6.7	3.63	3.03	0.5	14.8	37
5/30/75	15:34:51	271.3	2.5	31.2	6.10	5.13	0.0	35.2	29	6.7	4.62	3.11	0.4	21.2	18
5/30/75	15:34:51	271.2	2.5	30.9	6.33	5.22	0.0	35.7	29	6.7	4.08	3.53	1.2	13.4	16
5/30/75	15:34:51	271.5	3.4	23.2	2.19	1.85	0.0	26.2	27	6.3	3.68	2.83	1.8	14.8	14
5/30/75	15:37:50	270.6	3.4	25.5	2.48	2.08	0.0	28.9	28	4.8	2.77	2.20	1.9	11.4	17
5/30/75	15:37:50	271.1	4.5	19.2	0.81	0.70	0.0	19.8	4	3.2	2.33	2.33	0.8	5.5	2
5/30/75	15:37:50	270.7	0.5	29.0	3.58	2.56	0.0	32.2	23	8.9	2.89	2.41	2.7	13.3	13
5/30/75	15:37:50	271.5	0.5	24.3	2.11	1.61	0.0	27.5	20	7.3	4.41	3.92	1.3	13.6	10
5/30/75	15:38:26	271.3	0.5	26.4	3.90	2.83	0.0	29.1	25	6.1	2.58	2.20	2.4	11.5	12
5/30/75	15:38:26	271.3	1.6	24.3	3.14	2.82	0.0	27.0	14	7.3	2.67	2.37	3.8	11.3	10
5/30/75	15:38:26	270.4	1.6	25.4	5.16	4.81	0.0	29.7	8	11.6	8.00	6.85	5.0	26.3	5
5/30/75	15:38:26	271.2	2.5	24.6	2.76	2.39	0.0	26.4	4	10.8	9.03	9.03	1.7	19.8	2
5/30/75	15:41:14	270.6	0.5	18.2	0.80	0.77	0.0	18.7	2	12.1	0.0	0.0	12.1	12.1	1
5/30/75	15:41:14	271.5	0.5	25.3	3.16	2.26	0.0	27.0	5	12.5	4.25	3.57	9.0	19.7	4
5/30/75	15:43:44	271.5	2.5	22.4	1.17	1.10	0.0	23.7	11	4.9	3.26	2.58	1.3	10.7	5
5/30/75	15:43:44	271.5	3.6	25.5	0.29	0.26	0.0	25.8	3	1.8	0.0	0.0	1.8	1.8	1
5/30/75	15:43:44	270.8	0.5	26.3	2.62	2.20	0.0	29.2	11	6.5	3.93	3.50	2.4	13.3	6
5/30/75	15:45:13	270.4	0.5	36.1	0.21	0.21	0.0	36.3	2	4.7	0.0	0.0	4.7	4.7	[illegible]
5/30/75	15:45:13	271.3	0.5	33.3	0.33	0.32	0.0	33.6	2	4.4	0.0	0.0	4.4	4.4	[illegible]
5/30/75	15:50:28	270.3	3.6	32.6	2.24	1.85	0.0	35.4	7	7.5	3.90	3.49	1.5	11.2	4
5/30/75	15:51:47	270.1	0.5	29.7	2.34	1.85	0.0	33.0	10	7.4	4.18	3.99	2.5	12.6	5
5/30/75	15:51:47	270.6	1.6	25.1	2.78	2.14	0.0	28.9	20	8.3	2.80	2.24	4.5	14.7	10
5/30/75	15:53:44	270.4	2.5	27.7	3.66	2.88	0.0	33.6	41	7.9	4.45	3.85	2.0	15.5	24
5/30/75	15:53:44	271.3	2.5	27.9	2.93	2.14	0.0	33.6	43	6.6	4.80	4.03	0.5	19.7	23
5/30/75	15:53:44	271.8	3.6	25.7	2.41	1.77	0.0	28.5	37	5.3	3.15	2.71	0.2	12.0	23
5/30/75	15:53:44	270.0	3.6	21.9	2.92	2.57	0.0	26.2	41	8.1	3.20	2.52	2.5	15.1	16
5/30/75	15:53:44	270.3	0.5	26.8	2.00	1.65	0.0	29.2	35	5.7	3.20	2.75	1.3	13.4	21
5/30/75	15:55: 2	271.1	0.4	25.9	3.24	2.60	0.0	29.4	36	6.2	3.84	3.11	1.3	17.1	22
5/30/75	15:55: 2	272.0	0.5	24.7	2.94	2.38	0.0	27.5	21	6.8	2.77	2.38	1.4	11.3	10
5/30/75	15:55: 2	271.1	0.5	26.0	2.50	1.85	0.0	29.5	39	5.9	3.41	2.80	0.5	14.0	24
5/30/75	15:55: 2	271.9	0.5	25.5	3.06	2.29	0.0	29.5	33	6.5	4.19	3.30	0.2	16.3	18
5/30/75	15:55: 2	270.5	1.5	23.7	2.48	1.97	0.0	27.0	48	6.9	4.39	3.19	1.6	22.5	29
5/30/75	15:56:58	270.7	2.5	24.5	3.79	3.28	0.0	29.5	53	6.7	3.68	2.93	0.3	16.5	31
5/30/75	15:56:58	271.6	2.5	24.5	3.62	3.02	0.0	29.4	52	6.1	3.37	2.99	1.9	13.5	32
5/30/75	15:56:58	271.5	3.6	24.9	2.70	2.29	0.0	28.1	36	6.0	3.68	2.98	0.7	13.9	21
5/30/75	15:56:58	270.6	3.6	23.1	2.85	2.44	0.0	26.8	25	7.8	4.40	3.77	2.9	18.8	15
5/30/75	15:56:58	270.5	0.4	26.2	4.61	4.14	0.0	31.6	43	6.1	3.73	2.97	0.4	16.1	24
5/30/75	15:58:17	271.4	0.4	23.5	3.07	2.60	0.0	27.2	58	4.9	2.96	2.39	1.0	13.5	36
5/30/75	15:58:17	271.3	0.4	25.4	4.08	3.44	0.0	30.2	37	6.8	4.29	3.28	0.6	20.1	22
5/30/75	15:58:17	272.0	1.6	24.4	3.42	2.94	0.0	29.7	33	7.9	3.40	2.99	2.2	13.2	15
5/30/75	15:58:17	271.1	1.6	21.7	2.05	1.61	0.0	24.7	35	8.1	4.07	3.57	2.2	16.2	19
5/30/75	15:58:17	270.3	1.6	22.0	2.69	2.10	0.0	25.1	19	7.7	3.91	3.58	1.7	12.7	7
5/30/75	16: 1: 7	270.9	2.5	24.6	2.75	2.53	0.0	28.2	23	6.2	3.51	3.01	1.0	11.6	13
5/30/75	16: 1: 7	271.8	2.5	22.7	2.77	2.30	0.0	26.5	16	7.8	4.05	3.39	2.2	15.1	8
5/30/75	16: 1: 7	270.4	3.6	22.3	2.51	2.22	0.0	25.5	17	6.5	2.43	1.89	2.3	10.3	6
5/30/75	16: 1: 7	270.6	0.5	28.9	1.58	1.33	0.0	31.1	10	8.6	1.09	1.03	7.1	9.5	3
5/30/75	16: 2: 6	270.8	1.5	29.8	3.29	2.63	0.0	32.7	10	9.1	4.13	3.53	2.4	14.5	5
5/30/75	16: 2: 6	270.3	2.5	24.3	3.45	2.96	0.0	27.6	18	8.1	3.69	3.02	2.4	14.1	9
5/30/75	16: 2: 6	271.1	3.6	24.1	1.94	1.62	0.0	26.7	22	6.3	4.67	3.84	1.4	17.9	13
5/30/75	16: 4:48	270.3	0.5	27.8	2.92	2.39	0.0	31.1	18	6.5	3.34	3.05	0.9	10.9	10
5/30/75	16: 4:48	272.0	0.5	28.6	2.87	2.51	0.0	32.2	13	6.8	2.64	2.15	2.4	10.8	9
5/30/75	16: 4:48	270.0	0.5	21.6	1.91	1.63	0.0	23.7	15	5.5	2.81	2.54	0.9	9.4	9
5/30/75	16: 4:48	271.0	0.5	24.0	1.61	1.27	0.0	26.7	18	7.3	3.38	2.89	1.1	12.6	10
5/30/75	16: 4:48	270.6	1.6	22.9	0.97	0.78	0.0	24.7	14	7.4	2.22	2.04	4.1	10.8	7
5/30/75	16: 7:38	270.0	0.5	23.4	3.04	2.84	0.0	26.8	16	6.1	3.45	2.81	0.7	11.8	10
5/30/75	16: 7:38	270.9	0.5	25.3	3.65	2.85	0.0	29.2	20	6.1	3.18	2.73	2.7	12.7	12
5/30/75	16: 7:38	270.0	0.5	23.8	2.60	2.47	0.0	27.0	14	7.5	4.04	3.28	0.7	12.0	5
5/30/75	16: 8:37	270.9	0.5	22.9	2.31	2.16	0.0	25.5	8	6.5	2.01	1.83	3.6	9.1	5
5/30/75	16: 8:37	271.8	0.5	24.8	3.63	3.16	0.0	28.9	17	6.2	4.00	3.09	0.6	15.3	12
5/30/75	16: 8:37	271.6	1.6	22.7	0.51	0.46	0.0	23.3	6	5.6	3.64	3.25	1.7	10.5	3
5/30/75	16: 8:37	270.4	2.5	26.1	3.41	2.62	0.0	30.2	36	6.3	3.24	2.83	0.9	13.0	20
5/30/75	16: 8:37	271.8	1.6	22.5	1.74	1.47	0.0	25.8	36	6.3	2.45	2.04	0.9	10.0	17
5/30/75	16:10:53	271.0	3.6	21.4	1.63	1.27	0.0	23.7	42	5.6	2.39	1.73	2.7	13.7	24
5/30/75	16:10:53	270.1	3.6	21.7	2.48	2.01	0.0	26.4	38	6.2	3.95	3.17	0.3	15.1	18
5/30/75	16:10:53	270.7	0.5	27.9	3.78	3.07	0.0	33.0	33	6.1	2.68	2.23	0.4	9.9	17
5/30/75	16:10:53	270.0	0.5	27.4	4.39	3.85	0.0	33.7	41	6.3	3.68	3.12	0.3	13.8	2[illegible]
5/30/75	16:10:53	270.9	0.5	27.5	3.90	3.43	0.0	32.4	44	5.1	2.65	2.25	0.1	9.8	2[illegible]
5/30/75	16:11:28	271.8	0.5	27.1	3.94	3.31	0.0	31.5	42	5.7	2.94	2.38	1.5	12.6	2[illegible]
5/30/75	16:11:28	271.4	1.6	26.1	4.41	3.77	0.0	30.6	41	5.5	3.83	3.12	0.7	15.6	2[illegible]
5/30/75	16:11:28	270.6	1.6	27.7	4.90	4.14	0.0	32.4	30	7.1	4.16	3.43	0.9	16.9	1[illegible]
5/30/75	16:11:28	270.5	2.5	26.5	5.34	4.78	0.0	31.5	36	6.0	3.41	2.88	0.5	12.6	2[illegible]
5/30/75	16:11:28	271.4	2.5	26.1	4.83	4.25	0.0	31.9	33	7.9	3.95	3.30	1.9	14.5	2[illegible]
5/30/75	16:14:33	271.6	3.6	22.7	2.49	2.09	0.0	26.7	35	6.6	4.97	3.92	0.5	20.2	1[illegible]
5/30/75	16:14:33	270.1	0.5	28.2	3.46	2.49	0.0	31.1	17	6.5	3.13	2.59	2.5	12.6	1[illegible]
5/30/75	16:14:33	271.0	0.5	29.2	5.57	4.69	0.0	34.1	22	6.3	2.29	1.81	3.1	11.7	1[illegible]
5/30/75	16:14:33	270.3	0.5	22.4	1.54	1.23	0.0	25.1	19	5.1	3.67	3.21	0.7	12.0	1[illegible]
5/30/75	16:14:33	272.0	1.6	22.1	1.87	1.55	0.0	25.2	25	7.1	3.25	2.75	2.8	14.0	12
5/30/75	16:15: 8	271.1	1.6	21.1	1.20	0.79	0.0	22.5	19	5.7	3.49	2.87	0.1	10.0	8
5/30/75	16:15: 8	270.9	2.5	18.5	0.45	0.26	0.0	18.6	4	6.0	0.58	0.58	5.5	6.6	2
5/30/75	16:15: 8	271.8	2.5	18.5	0.67	0.57	0.0	19.8	15	4.1	2.10	1.56	2.1	8.6	7

3-BIN 5/30/75 — REFLECTIVITY (10 log Z) — LIQUID WATER CONTENT (g/m^3)

DATE	TIME	AZ.	EL.	MEAN	STDEV	AVDEV	MIN	MAX	NPTS	MEAN	STDEV	AVDEV	MIN	MAX	NPTS
5/30/75	14:54:25	270.5	2.4	20.3	0.17	0.14	0.0	20.3	3	4.5	0.0	0.0	4.5	4.5	1
5/30/75	14:54:25	271.8	3.4	22.9	1.94	1.68	0.0	25.0	16	4.7	2.64	2.15	0.6	10.1	10
5/30/75	14:54:25	270.1	3.4	24.9	2.98	2.45	0.0	27.8	11	5.1	1.09	0.97	3.5	6.3	6
5/30/75	14:54:25	270.9	4.5	21.7	2.50	2.24	0.0	24.9	17	3.6	1.96	1.83	1.3	6.7	12
5/30/75	14:54:25	271.8	4.5	27.7	4.27	3.55	0.0	31.5	24	5.0	2.55	2.27	0.6	8.4	12
5/30/75	14:57:35	271.8	3.5	21.4	2.68	2.37	0.0	23.7	9	8.1	3.72	3.25	3.5	14.0	6
5/30/75	14:57:35	270.9	3.5	20.0	1.57	1.40	0.0	21.8	6	5.6	4.09	3.91	0.8	10.9	5
5/30/75	14:57:35	270.0	3.5	20.3	0.28	0.23	0.0	20.5	3	6.6	0.38	0.38	6.3	7.0	2
5/30/75	14:59:55	270.2	4.5	18.8	0.75	0.52	0.0	19.2	4	4.2	1.15	1.15	3.0	5.3	2
5/30/75	15:23:59	270.7	0.4	27.4	0.83	0.61	0.0	28.0	8	4.2	2.15	1.68	1.4	7.4	4
5/30/75	15:23:59	271.6	0.4	31.4	1.42	1.10	0.0	33.4	14	5.7	3.54	3.06	1.5	12.5	9
5/30/75	15:23:59	270.6	1.4	20.5	0.32	0.27	0.0	20.7	6	5.2	2.46	2.28	1.8	8.1	4
5/30/75	15:23:59	270.5	2.5	30.0	2.70	2.29	0.0	33.1	17	4.8	2.83	2.35	1.3	11.0	10
5/30/75	15:25:53	270.4	3.4	25.4	2.15	1.86	0.0	27.6	9	6.2	3.52	2.73	1.5	12.4	6
5/30/75	15:25:53	270.0	0.4	28.8	2.69	2.07	0.0	30.9	18	4.4	2.34	1.89	0.5	7.7	8
5/30/75	15:25:53	270.9	0.4	31.4	5.13	3.88	0.0	34.6	15	7.1	3.24	2.26	1.4	14.6	10
5/30/75	15:27:27	271.6	0.4	29.5	2.75	1.93	0.0	32.0	18	6.3	2.69	2.40	2.5	10.4	8
5/30/75	15:27:27	272.0	1.5	28.4	3.93	3.10	0.0	33.4	36	5.6	2.72	2.20	1.0	12.2	24
5/30/75	15:27:27	270.5	1.4	26.8	3.46	2.53	0.0	30.5	34	6.3	3.43	2.45	1.6	17.0	22
5/30/75	15:27:27	270.5	2.5	29.1	2.97	2.58	0.0	32.6	31	5.5	3.75	3.02	0.3	13.5	15
5/30/75	15:27:27	271.3	2.5	27.4	2.09	1.72	0.0	30.6	27	4.0	1.75	1.53	1.7	7.0	16
5/30/75	15:28: 9	271.9	3.5	23.3	1.96	1.70	0.0	26.4	26	5.5	4.12	3.38	0.3	15.2	14
5/30/75	15:28: 9	271.2	3.5	23.0	2.33	1.88	0.0	27.3	29	3.9	2.52	2.15	0.1	9.8	14
5/30/75	15:28: 9	270.5	3.4	23.8	1.61	1.30	0.0	25.7	26	3.3	1.69	1.38	0.6	6.7	15
5/30/75	15:28: 9	270.4	4.5	22.1	0.74	0.56	0.0	22.7	8	3.9	2.02	1.77	1.7	6.5	3
5/30/75	15:28: 9	271.8	4.5	24.3	3.49	2.90	0.0	27.2	22	3.1	2.31	1.75	1.2	9.2	10
5/30/75	15:30:53	270.0	0.4	26.9	2.86	2.37	0.0	29.9	35	4.5	2.73	2.18	0.6	12.2	24
5/30/75	15:30:53	270.9	0.4	27.5	2.28	1.82	0.0	29.9	29	4.7	2.48	1.92	0.8	9.6	14
5/30/75	15:30:53	271.7	0.4	27.6	3.09	2.56	0.0	31.7	33	5.4	3.27	2.60	0.1	13.3	16
5/30/75	15:30:53	271.2	0.4	27.3	2.33	1.75	0.0	29.9	34	6.0	3.23	2.62	0.4	13.7	18
5/30/75	15:30:53	271.9	1.4	27.4	2.90	2.41	0.0	29.7	29	6.7	3.52	2.94	1.6	14.8	22
5/30/75	15:31:30	271.1	1.4	24.8	3.08	2.72	0.0	29.3	28	7.7	3.85	3.23	0.5	13.8	21
5/30/75	15:31:30	270.2	2.5	21.4	1.84	1.53	0.0	24.8	20	6.0	3.07	2.80	2.0	11.1	9
5/30/75	15:31:30	271.1	2.5	22.8	2.29	1.74	0.0	26.3	20	8.5	3.15	2.79	4.3	14.1	11
5/30/75	15:31:30	271.9	3.4	26.2	4.82	3.97	0.0	29.3	9	6.5	2.62	2.39	3.1	10.9	7
5/30/75	15:31:30	271.1	3.4	20.3	0.17	0.13	0.0	20.3	2	6.7	0.0	0.0	6.7	6.7	1
5/30/75	15:33:50	270.5	4.5	18.6	1.56	1.41	0.0	20.4	5	9.2	4.57	3.72	1.8	13.5	4
5/30/75	15:33:50	270.0	0.4	23.7	2.44	2.18	0.0	26.9	31	3.8	2.46	2.03	0.1	9.0	19
5/30/75	15:33:50	270.9	0.4	24.5	3.16	2.91	0.0	27.9	22	6.1	2.99	2.59	0.9	11.6	14
5/30/75	15:33:50	270.7	0.4	24.6	1.93	1.56	0.0	27.7	37	4.3	3.07	2.52	0.4	10.8	21
5/30/75	15:34:51	271.6	0.4	23.9	2.59	2.12	0.0	27.1	28	4.4	2.43	1.97	0.5	8.4	17
5/30/75	15:34:51	270.6	1.4	25.3	4.21	3.51	0.0	31.2	67	5.5	3.03	2.58	0.3	11.4	40
5/30/75	15:34:51	270.3	2.5	31.2	5.92	5.02	0.0	34.8	28	4.8	3.95	3.00	0.2	14.3	20
5/30/75	15:34:51	271.2	2.5	31.0	6.03	4.89	0.0	35.1	28	6.2	2.80	2.41	2.4	11.1	16
5/30/75	15:34:51	271.5	3.4	23.3	1.95	1.71	0.0	25.7	26	5.1	2.73	2.20	0.2	10.3	15
5/30/75	15:37:50	270.6	3.4	25.5	2.35	2.04	0.0	28.3	27	4.6	2.17	1.58	1.8	10.7	14
5/30/75	15:37:50	271.1	4.5	19.2	0.48	0.36	0.0	19.4	3	3.4	0.0	0.0	3.4	3.4	1
5/30/75	15:37:50	270.7	0.5	29.2	2.93	2.06	0.0	31.7	21	6.2	3.32	2.81	1.0	11.7	14
5/30/75	15:37:50	270.4	0.5	24.3	1.94	1.47	0.0	26.9	19	6.8	2.70	2.15	1.4	10.1	10
5/30/75	15:38:26	271.3	0.5	26.6	3.27	2.25	0.0	28.5	23	4.1	2.93	2.21	0.0	12.2	15
5/30/75	15:38:26	271.3	1.6	24.6	2.94	2.51	0.0	27.0	12	7.1	2.35	1.77	2.0	10.8	10
5/30/75	15:38:26	270.4	1.6	25.9	4.23	3.82	0.0	29.1	6	10.6	6.92	5.64	2.9	22.3	5
5/30/75	15:38:26	271.2	2.5	24.5	1.63	1.39	0.0	25.7	3	16.1	0.0	0.0	16.1	16.1	1
5/30/75	15:41:14	271.5	0.5	25.4	1.59	1.41	0.0	26.5	4	9.5	2.64	2.37	6.7	13.0	3
5/30/75	15:43:44	271.5	2.5	22.5	0.80	0.64	0.0	23.4	10	4.2	2.17	2.02	1.1	7.0	5
5/30/75	15:43:44	271.5	3.6	25.5	0.24	0.23	0.0	25.7	2	3.1	0.0	0.0	3.1	3.1	1
5/30/75	15:43:44	270.8	0.5	26.4	2.46	2.12	0.0	28.7	10	5.7	3.80	3.55	0.7	10.9	6
5/30/75	15:50:28	270.3	3.6	32.5	1.97	1.65	0.0	34.9	6	6.1	2.14	1.92	3.0	8.7	5
5/30/75	15:51:47	270.1	0.5	30.2	1.56	1.52	0.0	32.0	8	6.5	2.70	2.36	2.9	9.5	3
5/30/75	15:51:47	270.6	1.6	25.1	2.30	1.76	0.0	28.5	17	6.2	2.72	2.36	1.9	10.9	10
5/30/75	15:53:44	270.4	2.5	27.7	3.32	2.59	0.0	33.2	39	6.3	3.71	3.27	1.2	12.9	25
5/30/75	15:53:44	271.3	2.5	28.1	2.13	1.67	0.0	32.7	38	6.0	3.38	2.46	0.8	15.0	23
5/30/75	15:53:44	271.8	3.6	25.7	2.11	1.54	0.0	28.2	34	5.1	2.86	2.43	0.9	10.4	17
5/30/75	15:53:44	270.0	3.6	22.1	2.80	2.40	0.0	26.4	35	6.1	3.29	2.89	0.5	10.5	14
5/30/75	15:53:44	270.3	0.5	26.8	1.77	1.52	0.0	28.7	33	4.4	2.73	2.43	0.3	9.7	20
5/30/75	15:55: 2	271.1	0.4	25.9	3.00	2.44	0.0	29.5	33	5.4	3.15	2.71	0.6	12.2	20
5/30/75	15:55: 2	272.0	0.5	25.0	2.41	1.96	0.0	27.3	18	6.5	2.99	2.69	2.0	10.2	10
5/30/75	15:55: 2	271.1	0.5	26.0	2.15	1.63	0.0	29.2	37	4.3	2.81	2.41	0.1	11.0	27
5/30/75	15:55: 2	271.9	0.5	25.7	2.59	1.99	0.0	28.4	29	5.0	2.47	2.07	0.1	9.4	17
5/30/75	15:55: 2	270.5	1.5	23.7	2.26	1.77	0.0	26.7	46	5.1	2.90	2.50	0.4	10.8	29
5/30/75	15:56:58	270.7	2.5	24.7	3.46	3.02	0.0	29.0	48	5.8	3.26	2.61	0.8	14.7	27
5/30/75	15:56:58	271.6	2.5	24.8	3.34	2.78	0.0	29.1	47	4.9	2.71	2.15	0.3	11.1	28
5/30/75	15:56:58	271.5	3.6	24.9	2.55	2.21	0.0	27.9	35	4.8	3.01	2.44	0.5	11.6	17
5/30/75	15:56:58	270.6	3.6	23.2	2.65	2.22	0.0	26.2	21	6.5	4.48	3.88	1.0	13.0	11
5/30/75	15:56:58	270.5	0.4	26.6	4.26	3.94	0.0	31.6	38	5.1	2.57	2.20	1.0	10.0	22
5/30/75	15:58:17	271.4	0.4	23.6	2.96	2.48	0.0	27.1	54	4.0	2.03	1.79	1.0	8.7	33
5/30/75	15:58:17	271.7	0.4	25.7	3.70	3.13	0.0	29.7	32	4.6	3.32	2.61	0.3	14.7	24
5/30/75	15:58:17	272.0	1.6	24.4	3.29	2.86	0.0	29.3	30	6.5	3.45	2.58	0.7	14.1	15
5/30/75	15:58:17	271.1	1.6	21.7	1.85	1.49	0.0	24.2	32	7.0	3.28	2.74	1.2	11.1	16
5/30/75	15:58:17	270.3	1.6	22.7	1.74	1.30	0.0	24.3	14	6.1	2.26	2.02	2.7	8.6	6
5/30/75	16: 1: 7	270.9	2.5	24.8	2.62	2.42	0.0	28.0	21	4.6	2.76	2.38	1.0	10.2	13
5/30/75	16: 1: 7	271.8	2.5	22.8	2.58	2.14	0.0	26.0	14	5.8	3.37	2.63	2.8	12.9	7
5/30/75	16: 1: 7	270.4	3.6	22.4	2.36	2.10	0.0	25.0	15	5.2	2.93	2.67	1.3	8.7	5
5/30/75	16: 1: 7	270.6	0.5	28.6	1.10	0.94	0.0	29.8	8	3.1	2.49	2.23	0.5	6.4	3
5/30/75	16: 2: 6	270.8	1.5	30.0	3.00	2.43	0.0	32.3	9	7.6	2.53	2.45	4.2	10.7	6
5/30/75	16: 2: 6	270.3	2.5	24.1	3.29	2.86	0.0	27.6	17	5.2	2.65	2.17	0.8	9.6	11
5/30/75	16: 4:48	270.1	0.5	24.1	2.58	2.49	0.0	30.7	17	5.0	4.15	3.42	0.6	14.4	11
5/30/75	16: 4:48	272.0	0.5	28.6	2.63	2.39	0.0	31.7	11	5.4	2.03	1.74	3.0	8.9	10
5/30/75	16: 4:48	270.0	0.5	21.4	1.76	1.46	0.0	23.3	14	5.7	1.99	1.56	2.5	[illegible]	9
5/30/75	16: 4:48	271.4	1.6	24.0	1.37	1.12	0.0	26.3	17	5.7	1.82	1.56	2.5	7.3	7
5/30/75	16: 4:48	270.6	1.6	22.9	0.77	0.63	0.0	23.9	13	4.3	2.71	1.95	1.0	10.4	12
5/30/75	16: 7:38	270.9	0.5	23.3	2.94	2.70	0.0	26.6	15	4.9	2.24	1.83	1.0	8.0	7
5/30/75	16: 7:38	270.9	0.5	25.4	3.49	2.73	0.0	28.7	19	6.6	3.21	2.55	0.9	10.6	8
5/30/75	16: 7:38	270.0	0.5	23.9	2.51	2.43	0.0	26.3	11	5.6	1.92	1.56	3.5	9.8	12
5/30/75	16: 7:38	270.8	0.5	22.7	3.23	3.04	0.0	28.5	16	4.1	2.35	2.29	1.8	7.1	5
5/30/75	16: 8:37	271.6	1.6	22.7	0.51	0.42	0.0	23.3	4	5.9	1.41	1.24	4.7	10.1	11
5/30/75	16: 8:37	271.8	2.5	26.1	3.01	2.38	0.0	30.1	33	10.9	0.0	0.0	10.9	10.9	1
5/30/75	16: 8:37	271.8	3.6	22.7	1.49	1.27	0.0	25.3	31	4.8	2.24	1.99	1.7	10.4	22
5/30/75	16:10:53	271.0	3.6	[illegible]	1.45	1.06	0.0	22.9	40	4.4	2.22	1.80	1.6	10.1	17
5/30/75	16:10:53	271.8	3.6	21.9	2.29	1.82	0.0	25.5	35	4.3	1.97	1.65	1.6	8.4	22
5/30/75	16:10:53	270.7	0.5	27.8	3.60	2.97	0.0	32.3	31	5.0	3.40	2.60	0.3	13.6	18
5/30/75	16:10:53	270.0	0.5	27.4	4.27	3.79	0.0	33.3	40	4.1	2.05	1.67	0.4	7.7	21
5/30/75	16:10:53	271.1	0.5	27.4	1.85	1.25	0.0	32.1	40	4.5	2.15	1.75	0.5	9.4	23
5/30/75	16:11:28	270.9	0.5	[illegible]	[illegible]	[illegible]	0.0	[illegible]	40	4.5	1.80	1.59	1.6	7.2	28
5/30/75	16:11:28	271.4	1.6	26.2	4.31	3.72	0.0	30.6	39	4.5	1.90	1.43	0.4	[illegible]	22
5/30/75	16:11:28	270.6	1.6	28.0	4.55	3.87	0.0	32.2	27	5.4	1.05	2.33	0.1	12.6	22
5/30/75	16:11:28	270.5	2.5	26.6	5.23	4.69	0.0	31.5	33	6.4	1.31	2.69	0.3	11.8	15
5/30/75	16:11:28	271.8	2.5	26.1	4.63	4.11	0.0	31.7	31	5.7	3.08	2.58	0.2	12.0	24
5/30/75	16:14:13	271.6	3.6	22.7	2.34	1.97	0.0	25.8	33	6.2	2.47	2.19	2.1	9.9	23
5/30/75	16:14:13	270.1	0.5	27.2	2.99	2.20	0.0	30.5	16	5.3	3.93	3.00	0.1	17.2	16
5/30/75	16:14:13	271.0	0.5	29.2	5.37	4.55	0.0	33.5	21	5.8	3.19	2.89	1.0	10.1	12
5/30/75	16:14:13	270.3	0.5	22.4	1.38	1.10	0.0	24.5	18	4.8	2.67	2.33	1.4	9.1	18
5/30/75	16:14:13	270.6	1.6	22.2	1.79	1.53	0.0	24.5	24	4.9	2.16	1.63	0.9	9.7	9
5/30/75	16:15: 8	271.0	1.6	[illegible]	0.67	0.54	0.0	[illegible]	17	4.9	2.78	1.96	1.5	11.2	13
5/30/75	16:15: 8	271.8	2.5	18.5	0.33	0.21	0.0	18.6	13	4.4	0.55	0.56	3.9	5.0	2
5/30/75	16:15: 8	271.8	2.5	18.5	0.62	0.55	0.0	19.4	13	4.4	2.27	1.89	0.6	6.3	4

APPENDIX B

18 April 1975

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1037	1.08	0.08	3.46	005
1038	0.85	0.08	3.59	005
1039	0.86	0.08	3.59	005
1040	1.10	0.08	3.59	005
1041	1.10	0.08	3.59	005
1042	1.04	0.08	3.30	005
1043	0.75	0.08	3.16	005
1044	0.82	0.08	3.51	005
1045	0.82	0.08	3.47	005
1046	0.50	0.08	1.91	005
1047	0.50	0.08	1.91	005
1048	0.46	0.00	1.91	005
1049	0.81	0.08	1.91	005
1050	1.57	0.08	5.55	005
1051	1.96	0.08	7.48	005
1052	1.29	0.08	4.17	005
1053	1.11	0.08	3.26	005
1054	0.76	0.08	1.91	005
1055	1.46	0.08	5.01	005
1056	1.66	0.08	5.99	005
1057	1.66	0.08	5.99	005
1058	1.66	0.08	5.99	005
1059	0.53	0.08	1.91	005
1100	0.48	0.08	1.91	005
1101	0.48	0.08	1.91	005
1102	0.48	0.08	1.91	005
1103	0.21	0.08	0.55	005
1104	0.19	0.08	0.45	005
1105	0.19	0.08	0.45	005
1106	0.19	0.08	0.45	005
1107	0.19	0.08	0.45	005
1108	0.19	0.08	0.45	005
1109	0.19	0.08	0.45	005
1110	0.19	0.08	0.45	005
1111	0.19	0.08	0.45	005
1112	0.19	0.08	0.45	005
1113	0.19	0.08	0.45	005

23 April 1975

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1115	2.66	0.51	5.73	005
1116	3.65	0.51	6.01	005
1117	5.42	0.56	13.62	005
1118	5.25	0.56	11.59	005
1119	4.13	1.27	6.99	005
1120	4.57	2.99	6.92	005
1121	4.66	3.23	5.65	005
1122	5.37	3.23	7.13	005
1123	5.50	2.56	8.00	005
1124	5.58	2.26	7.42	005
1125	5.38	2.26	6.49	005
1126	5.15	3.78	6.10	005
1127	4.43	1.73	6.87	005
1128	4.37	1.73	7.53	005
1129	4.69	1.73	6.95	005
1130	4.59	1.73	6.29	005
1131	4.27	1.73	6.29	005
1132	3.78	1.89	6.29	005
1133	4.43	2.02	7.02	005
1134	4.63	2.02	8.06	005
1135	4.67	2.02	11.34	005
1136	2.19	1.29	3.21	005
1137	2.29	1.29	3.69	005
1138	2.37	1.85	3.69	005
1139	2.47	1.42	4.97	005
1140	4.12	0.66	7.99	005
1141	3.65	0.66	7.47	005
1142	3.17	0.59	7.64	005
1143	2.79	0.24	7.70	005
1144	2.90	0.24	7.70	005
1145	4.17	1.42	7.32	005
1146	3.05	1.42	7.25	005
1147	2.50	0.60	7.25	005
1148	1.98	0.00	5.75	005
1149	1.40	0.00	4.69	005
1150	1.66	0.00	3.70	005

30 April 1975

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1545	12.57	12.57	12.57	001
1546	5.96	5.96	5.96	001
1547	3.56	3.56	3.56	001
1548	3.69	3.69	3.69	001
1549	6.19	6.19	6.19	001
1550	10.57	0.24	20.90	002
1551	20.03	0.00	40.07	002
1552	23.81	0.00	47.63	002
1553	16.39	0.00	32.78	002
1554	20.83	0.00	41.66	002
1555	23.80	0.00	47.61	002
1556	27.26	1.48	53.05	002
1557	44.91	2.49	87.33	002
1558	80.54	2.34	158.74	002
1559	49.06	0.82	97.30	002
1600	9.94	3.37	16.52	002
1601	9.48	4.84	14.12	002
1602	5.96	5.13	6.80	002
1603	10.89	5.71	16.07	002
1604	9.94	0.00	23.76	003
1605	14.55	0.22	37.37	003
1606	19.93	1.31	55.53	003
1607	12.37	0.00	28.35	004
1608	7.75	0.00	26.42	005
1609	10.70	0.00	51.99	005
1610	13.36	0.00	66.16	005
1611	13.92	0.00	69.27	005
1612	16.07	0.00	53.63	005
1613	17.69	0.00	49.42	005
1614	13.92	0.00	40.79	005
1615	11.32	0.00	41.49	005
1616	9.48	0.00	36.67	005
1617	5.75	0.00	26.86	005
1618	7.34	0.00	32.85	005
1619	12.57	0.00	52.23	005
1620	10.51	0.00	41.61	006
1621	10.45	0.00	41.06	006
1622	8.51	0.00	21.10	006
1623	5.68	0.00	26.13	006
1624	5.06	0.00	21.81	006
1625	4.53	0.00	20.20	006
1626	7.06	0.00	34.24	006
1627	10.82	0.18	55.60	006
1628	7.32	0.18	32.37	006
1629	1.51	0.18	3.78	006
1630	1.89	0.18	3.78	006
1631	2.17	0.18	3.99	006

30 April 1975 (continued)

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1632	3.07	0.18	8.20	006
1633	5.03	0.18	17.01	006
1634	14.03	0.18	65.17	006
1635	9.35	0.18	39.27	006
1636	3.39	0.18	6.83	006
1637	2.11	0.18	6.59	006
1638	1.47	0.00	7.21	006
1639	1.30	0.00	6.43	006
1640	0.93	0.00	2.67	006
1641	0.96	0.18	2.67	006
1642	0.96	0.18	2.67	006
1643	0.96	0.18	2.75	006
1644	1.10	0.18	2.92	005
1645	0.96	0.00	2.92	005
1646	3.80	0.18	13.35	004
1647	7.06	0.00	26.29	004
1648	4.53	0.00	16.19	004
1649	3.48	0.45	10.51	004
1650	1.77	0.45	3.30	003

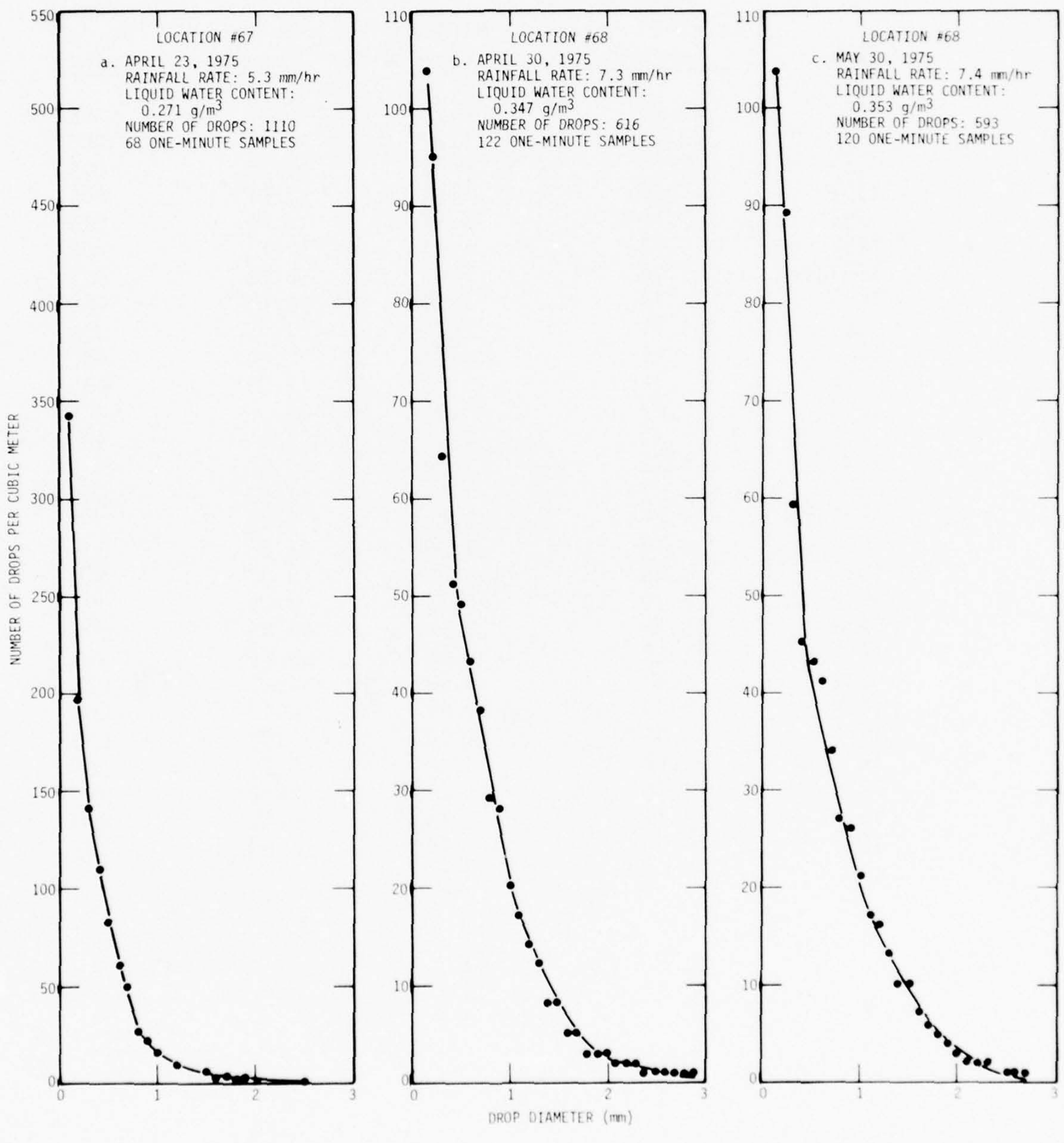
30 May 1975

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1505	0.87	0.87	0.87	001
1506	1.80	1.80	1.80	001
1507	37.78	37.78	37.78	001
1508	46.65	46.65	46.65	001
1509	30.18	30.18	30.18	001
1510	13.02	13.02	13.02	001
1511	10.38	10.38	10.38	001
1512	7.66	7.66	7.66	001
1513	7.66	7.66	7.66	001
1514	7.94	7.94	7.94	001
1515	8.30	8.30	8.30	001
1516	9.07	9.07	9.07	001
1517	11.03	11.03	11.03	001
1518	1.44	0.00	2.88	002
1519	0.93	0.00	1.87	002
1520	3.20	0.50	5.91	002
1521	21.08	12.84	29.33	002
1522	22.22	7.99	36.45	002
1523	5.89	0.74	11.05	002
1524	2.59	0.00	5.19	002
1525	0.16	0.00	0.33	002
1526	0.11	0.00	0.22	002
1527	4.31	0.22	10.99	003
1528	11.06	0.22	31.21	003
1529	5.59	0.00	15.01	003
1530	4.04	1.29	7.21	003
1531	3.48	2.96	3.84	003
1532	4.53	2.45	7.31	003
1533	6.55	1.48	14.86	003
1534	6.57	1.43	15.18	003
1535	4.97	1.37	10.44	003
1536	5.73	1.37	12.65	003
1537	9.69	1.37	19.59	004
1538	10.53	1.37	34.32	004
1539	8.51	1.16	27.89	004
1540	4.51	0.34	13.75	004
1541	2.01	0.00	4.04	004
1542	1.98	0.00	5.23	004
1543	3.63	0.34	6.55	004
1544	4.27	1.53	8.12	005
1545	14.86	4.41	44.30	005
1546	23.36	6.06	58.68	005
1547	23.62	7.66	52.91	005
1548	18.84	4.72	32.26	005
1549	13.64	0.80	30.29	005
1550	16.27	1.05	44.60	005

30 May 1975 (continued)

Time	Mean Rainfall Rate (mm/hr)	Minimum Rate	Maximum Rate	No. of Points
1551	22.09	6.75	36.96	005
1552	22.68	11.27	38.10	005
1553	16.94	4.83	42.48	005
1554	11.20	4.69	23.02	005
1555	10.40	1.11	18.66	005
1556	15.77	1.43	37.29	005
1557	11.74	1.88	32.86	005
1558	12.18	3.29	35.46	005
1559	9.82	2.38	27.85	005
1600	5.47	0.89	8.28	005
1601	5.04	0.91	12.73	005
1602	10.87	0.91	42.35	005
1603	12.23	1.38	33.24	005
1604	8.52	1.79	20.93	005
1605	6.19	1.51	11.57	005
1606	4.79	1.51	8.03	005
1607	4.57	0.96	11.87	005
1608	7.83	0.87	19.07	005
1609	6.14	4.52	8.06	005
1610	15.44	3.52	48.69	005
1611	13.28	2.40	49.08	005
1612	3.49	0.77	8.98	005
1613	8.19	2.91	16.17	005
1614	8.05	3.29	11.57	005
1615	7.88	3.07	15.45	005
1616	7.16	1.09	15.88	005
1617	7.17	1.14	16.60	005
1618	6.90	1.48	20.03	005

Appendix C


LOCATION #67
a. APRIL 23, 1975
RAINFALL RATE: 5.3 mm/hr
LIQUID WATER CONTENT: 0.271 g/m3
NUMBER OF DROPS: 1110
68 ONE-MINUTE SAMPLES
LOCATION #68
b. APRIL 30, 1975
RAINFALL RATE: 7.3 mm/hr
LIQUID WATER CONTENT: 0.347 g/m3
NUMBER OF DROPS: 616
122 ONE-MINUTE SAMPLES
LOCATION #68
c. MAY 30, 1975
RAINFALL RATE: 7.4 mm/hr
LIQUID WATER CONTENT: 0.353 g/m3
NUMBER OF DROPS: 593
120 ONE-MINUTE SAMPLES
NUMBER OF DROPS PER CUBIC METER
DROP DIAMETER (mm)
0
1
2
3
0
50
100
150
200
250
300
350
400
450
500
550
0
10
20
30
40
50
60
70
80
90
100
110

APPENDIX D

30 APRIL 1975 CASE STUDY

The CHILL radar data from the storm of 30 April 1975 were analyzed for reflectivity, liquid water content, and rainfall rate. Ground data were obtained from six raingages set out along the 271^{o} radial (see Fig. 1 in the report). Liquid water content was determined in two ways, by the Eccles-Mueller attenuation equation (1971), and by using the 10 cm reflectivity in a Z-M relationship based on the Jones (1956) central Illinois thunderstorm data and a relationship given by Atlas (1964). Z and M are determined in the following manner:

$$M = 0.52R^{0.97}$$

$$Z = 31500m^{1.41}$$

The Jones Z-M equation was used because the radar data discussed here were gathered in central Illinois. However, a comparison of this equation with that of Marshall-Palmer and India thunderstorm data (Battan, 1973) indicates no significant difference between the liquid water content amounts calculated by each method. Table 1 contains the comparative data calculated for measurements made at gage 65 in the East-Central Illinois network on 30 April 1975. The rainfall rates are 5 minute averages centered on the indicated time.

The reflectivity data required considerable smoothing prior to use in any of the radar equations because of equipment eccentricities, and the real-time variability of the precipitation (that is, hydrometeor scatterers). Smoothing of the observed reflectivity data for the calculation of liquid water content was achieved in the following way.

Three-bin moving averages were calculated along each radial between 269 and 273^{o} azimuth and at a given elevation angle. The averaged reflectivity measurements thus generated were further averaged by accumulation of values in each bin in the horizontal plane between the azimuth constraints and in the vertical between various elevation angle intervals. The elevation angle intervals

used were 0.3-0.7, 1.3-1.7, 2.3-2.7, and 3.3-3.7 degrees. These sums of 3-bin averaged reflectivity were divided by the number of measurements yielding the final values. The resulting spatially averaged reflectivity values were attributed to a ray path centered between the specified azimuths and elevation angle intervals.

Radar reflectivity data from a 60 minute period between 1600 and 1700 CDT on 30 April, 1975 were used to calculate liquid water content by the attenuation and reflectivity methods and vertical cross-sections were plotted and analyzed. The rain system moved from approximately 268° nearly parallel to the 271° radar radial. This direction of movement resulted in relative motion toward the radar with little cross-beam speed. The motion of a raincell associated with this storm can be seen in Figures 1 to 11.

The liquid water content was calculated by the Eccles-Mueller method along the 271° azimuth by using the range difference of reflectivity values between successive bins to calculate attenuation. The final liquid water content estimate was obtained from an average of 20 bin values centered above a gage location. Similarily, the Z-M equation was solved for liquid water content in each bin followed by the 20 bin averaging centered on the surface gage site. The results are discussed more fully in the next section.

Liquid Water Content

Figures 1 through 11 depict liquid water fields calculated by the Z-M relationship and by the attenuation as calculated from the dual-wavelength radar at three minute intervals over one hour's time. The triangles in the figures indicate the location of the raingages along the 271° radial, with gage 71 closest to the radar and gage 64 furthest away. The dots in the figure indicate the points above the gages where the final estimates of liquid water content were computed.

Liquid water content fields determined by using the attenuation equation had stronger gradients throughout the 60 minute period. The values of liquid water ranged from less than 1 g m^{-3} to in excess of 9 g m^{-3}. The liquid water estimated in this manner seems unrealistic in light of the large amount of calculated water that apparently does not reach the ground. For example, there is a closed isoline of 3.0 g m^{-3} above gage 65 (between 65 and 70 km) in Figure 1d. This area of high liquid water remains aloft through 1618 CDT (Figure 4b), and there is no evidence from the raingage data of this amount of water reaching the ground during or after this period. At 1621 CDT abnormally strong liquid water gradients became evident betweeen 30 and 40 km from the radar, continuing through 1654 CDT (Figure 10b).

Continuity between liquid water calculated aloft and ground values appears to be maintained, however, in the fields calculated by the Z-M relationship. The liquid water shown in Figure 1c at about 800 m above the second gage from the right appears on the ground 3 minutes later (Figure 2a). This continuity is generally maintained throughout the remainder of the 60 minute period, although the magnitude of the values decrease. There is also a lag evident between surface and above ground values (Figures 3a and 3c). This may be caused by the use of 5-minute averaged rainfall rates to compute the liquid water at the gages whereas the values above ground, derived from the radar reflectivity, are instantaneous.

In general, the liquid water calculated from the rainfall in the gages does not correlate well with the liquid water calculated from the attenuation of the radar beam. The radar estimates by the attenuation technique are approximately five to six times higher than what would normally be expected.

Liquid water content calculated using the Z-M relationship has a much better correlation to the liquid water calculated from the raingage data. There were some high values along the ground, but these can be probably be accounted for by the

the five minute rainfall rates used. The gradients of liquid water by the Z-M relation were more realistic than those calculated using the attenuation.

References

Battan, Louis J., 1973: Radar Observation of the Atmosphere (Rev. ed.) University of Chicago Press.

Jones, Douglas M.A., 1956: Rainfall drop-size distribution and radar reflectivity, Res. Report No. 6, Urbana, Meteorology Lab., Illinois State Water Survey NTIS No. AD10799.

Atlas, D., 1964: Advances in Radar Meteorology, et. by H.E. Landsberg and J. Van Mieghem, Advances in Geophysics, 10, New York, Academic Press, 318-478.

Time	Rainfall Rate	Jones Z (dbz)	Jones M (g/m^3)	Marshall Palmer Z	Marshall Palmer M	India-TSTM Z	India-TSTM M
1545	5.48	36.98	0.27	34.83	0.32	33.82	0.29
1550	23.70	45.70	1.12	45.0	1.16	42.78	0.97
1555	57.49	50.97	2.64	51.16	2.54	48.21	2.02
1600	58.36	51.06	2.69	51.27	2.57	48.31	2.04
1605	3.83	34.85	0.19	32.34	0.23	31.63	0.21
1610	0.0	0	0	0	0	0	0
1615	0.0	0	0	0	0	0	0
1620	0.0	0	0	0	0	0	0
1625	0.16	15.96	0.09	10.27	0.01	12.18	0.02
1630	0.78	25.38	0.04	21.28	0.06	21.88	0.06
1635	0.74	25.07	.04	20.92	0.05	21.56	0.05
1640	0.54	23.2	0.03	18.72	0.04	19.63	0.04

Table 1. Z and M data calculated by three different methods from rainfall rate data at gage 65, 30 April, 1975.

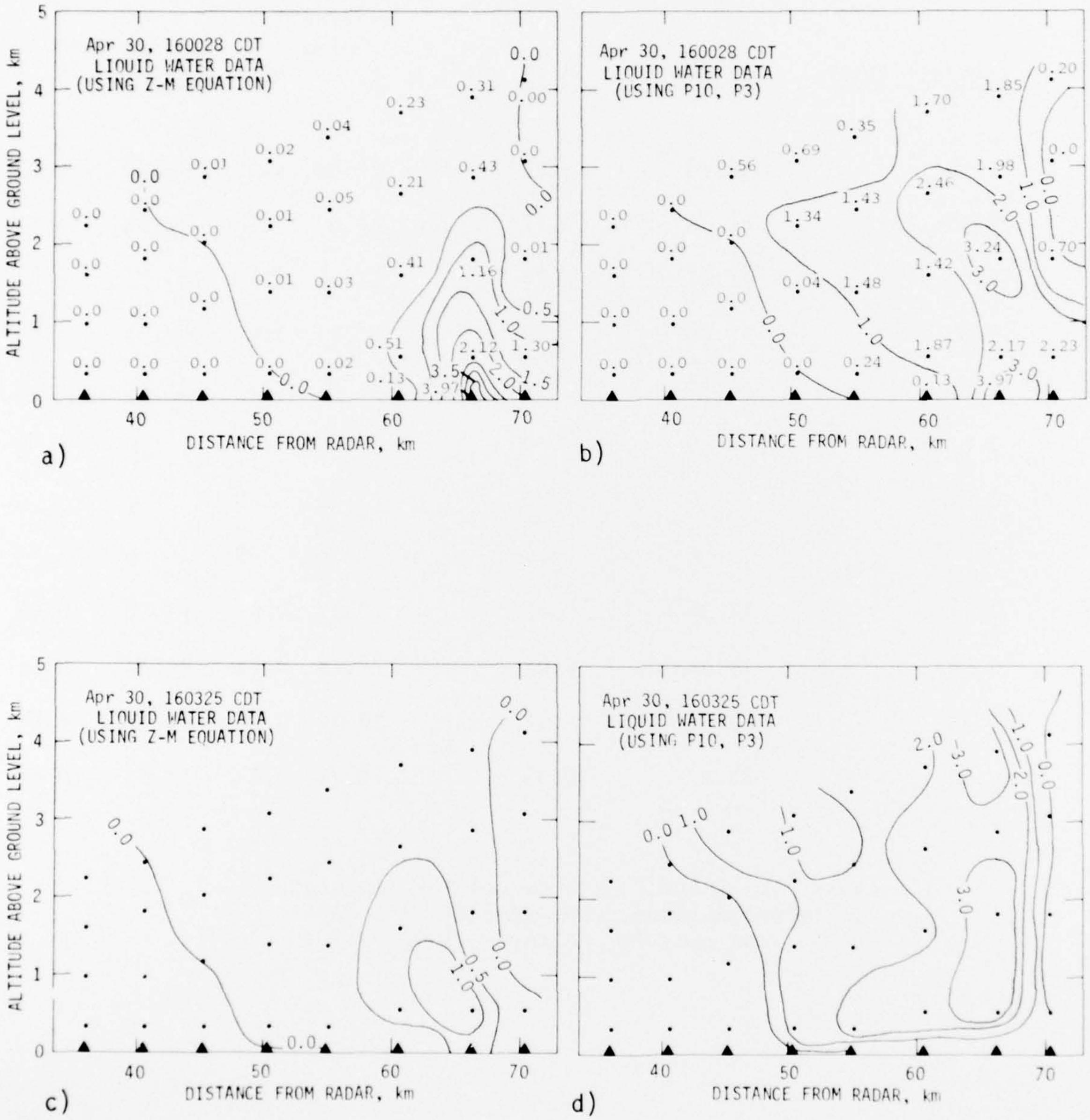


Figure 1. Liquid water content fields calculated by a Z-M relationship (a and c) and by radar attenuation (b and d) for 1600:28 and 1603:25 CDT on 30 April 1975. In a and b, the calculated values are shown, but in all other figures only the contours are illustrated.

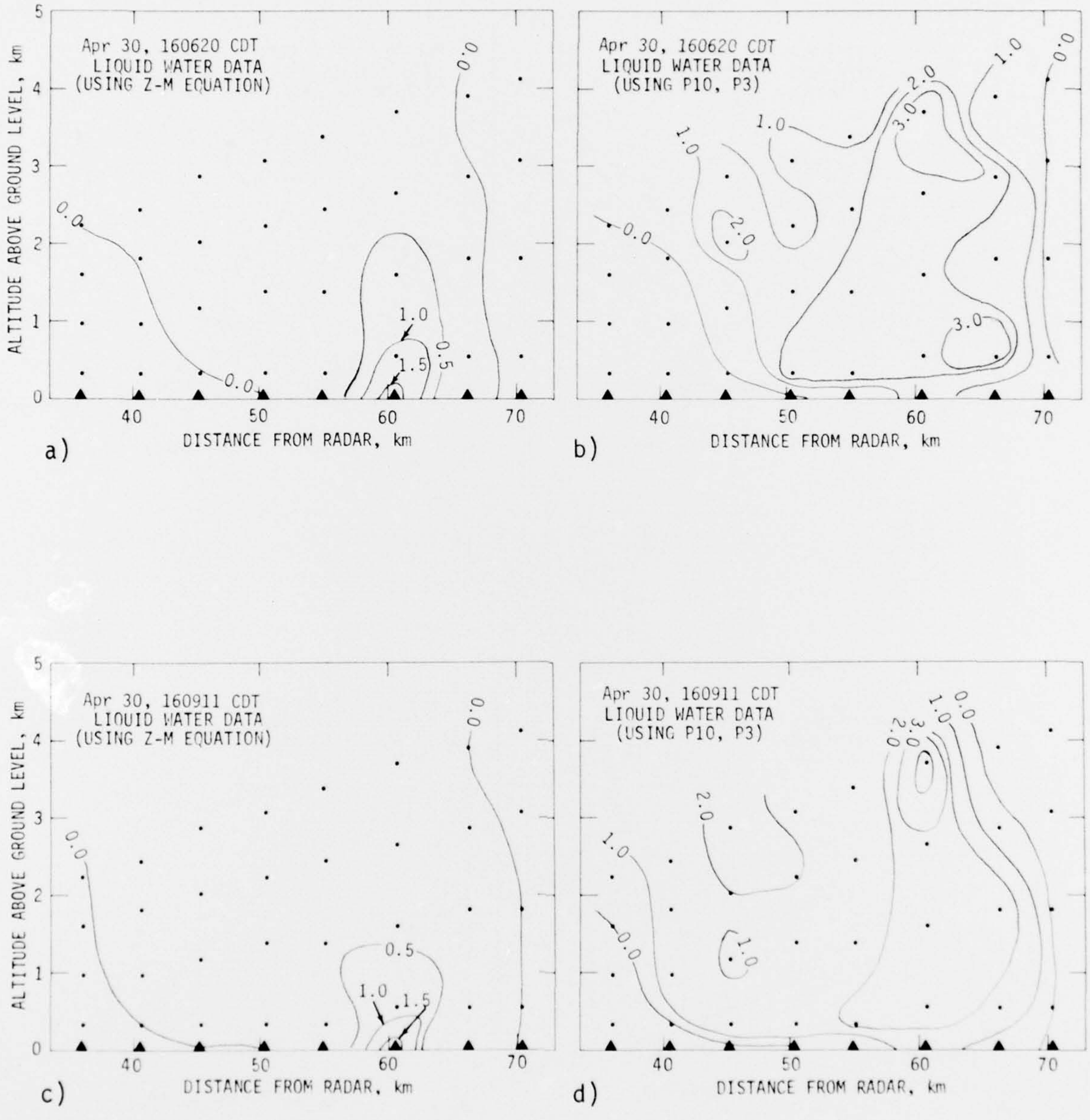


Figure 2. Same as Figure 1 for 1606:20 and 1609:11 CDT

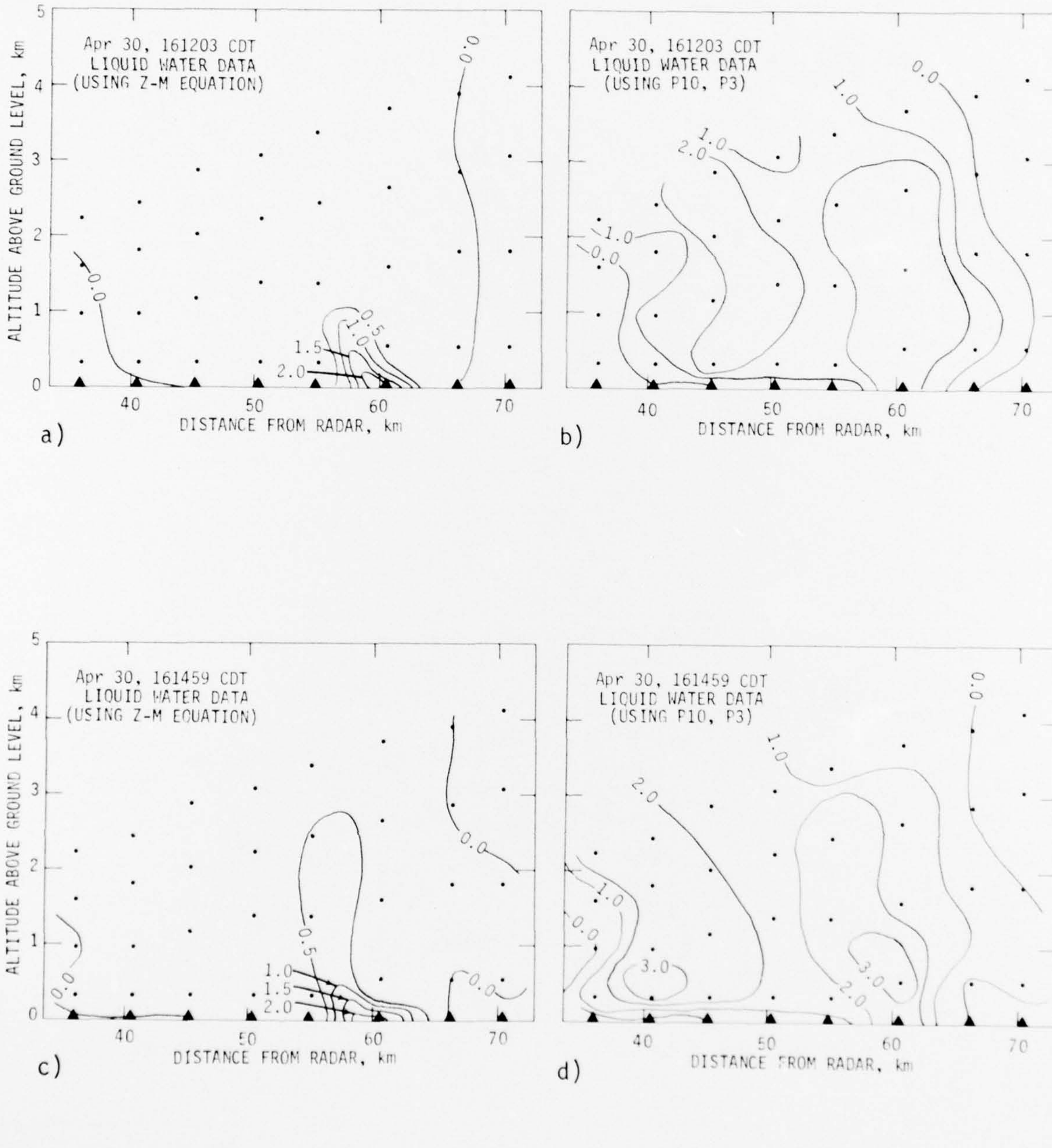


Figure 3. Same as Figure 1 for 1612:03 and 1614:59 CDT

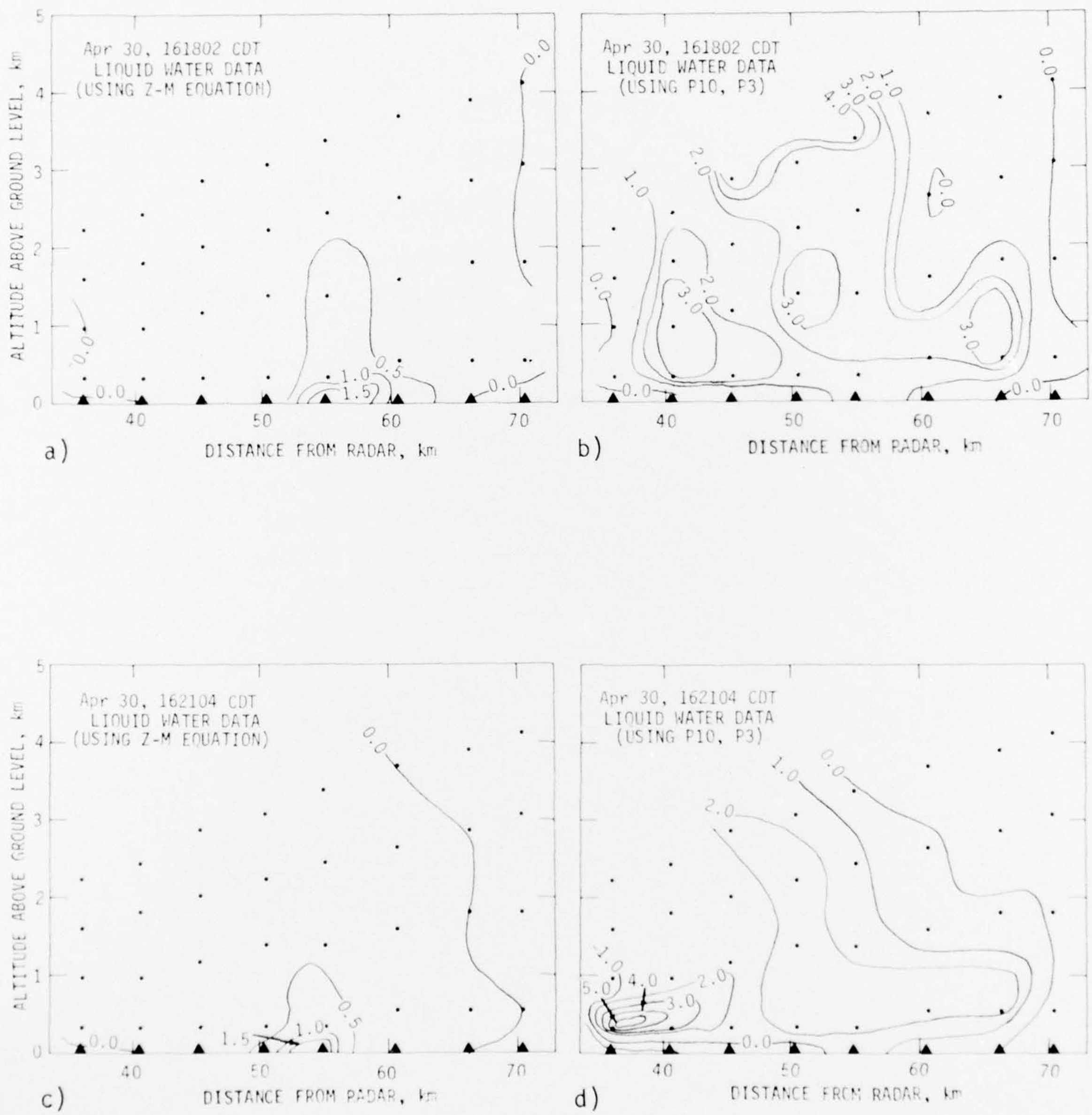


Figure 4. Same as Figure 1 for 1618:02 and 1621:04 CDT

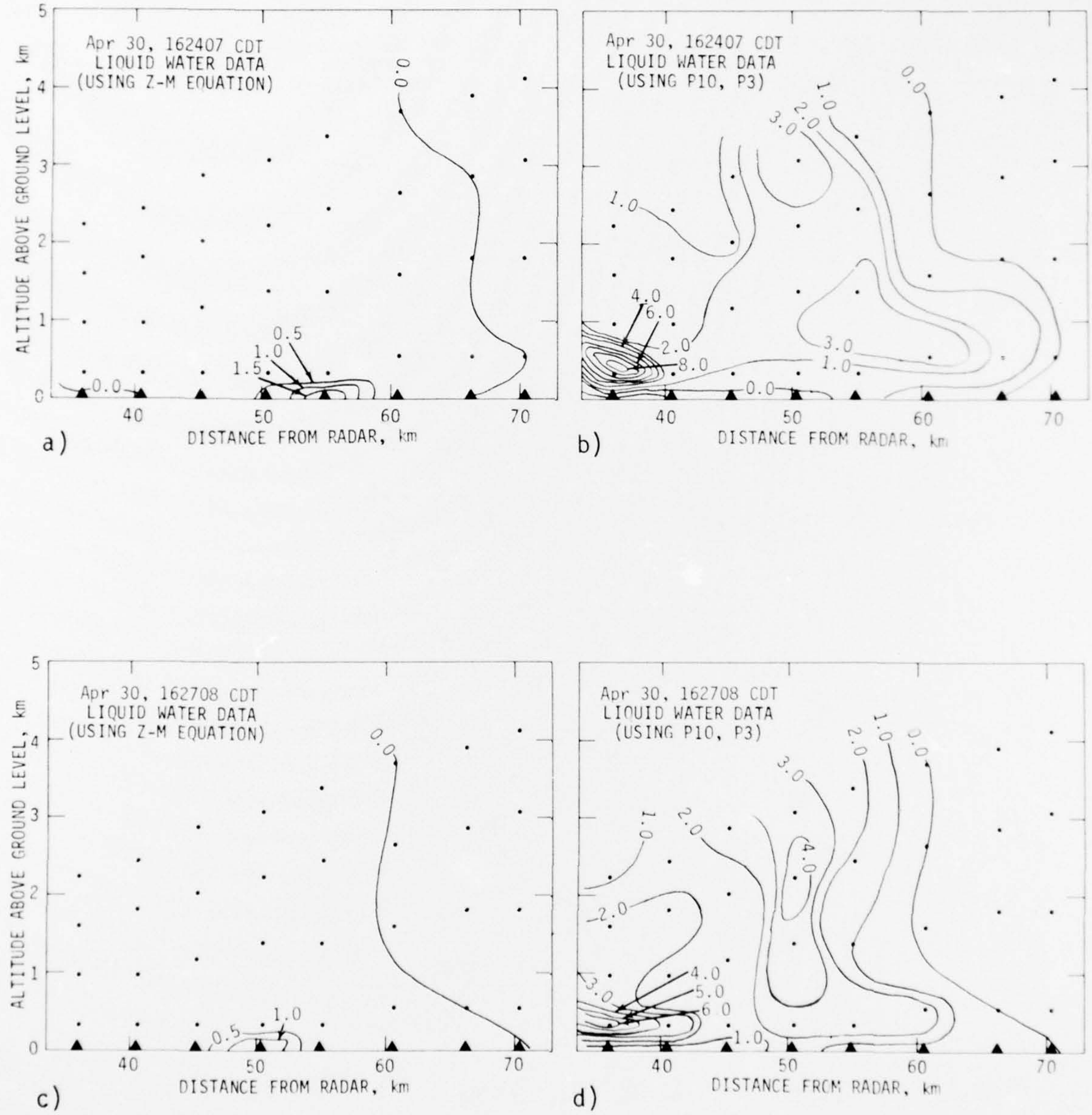


Figure 5. Same as Figure 1 for 1624:07 and 1627:08 CDT

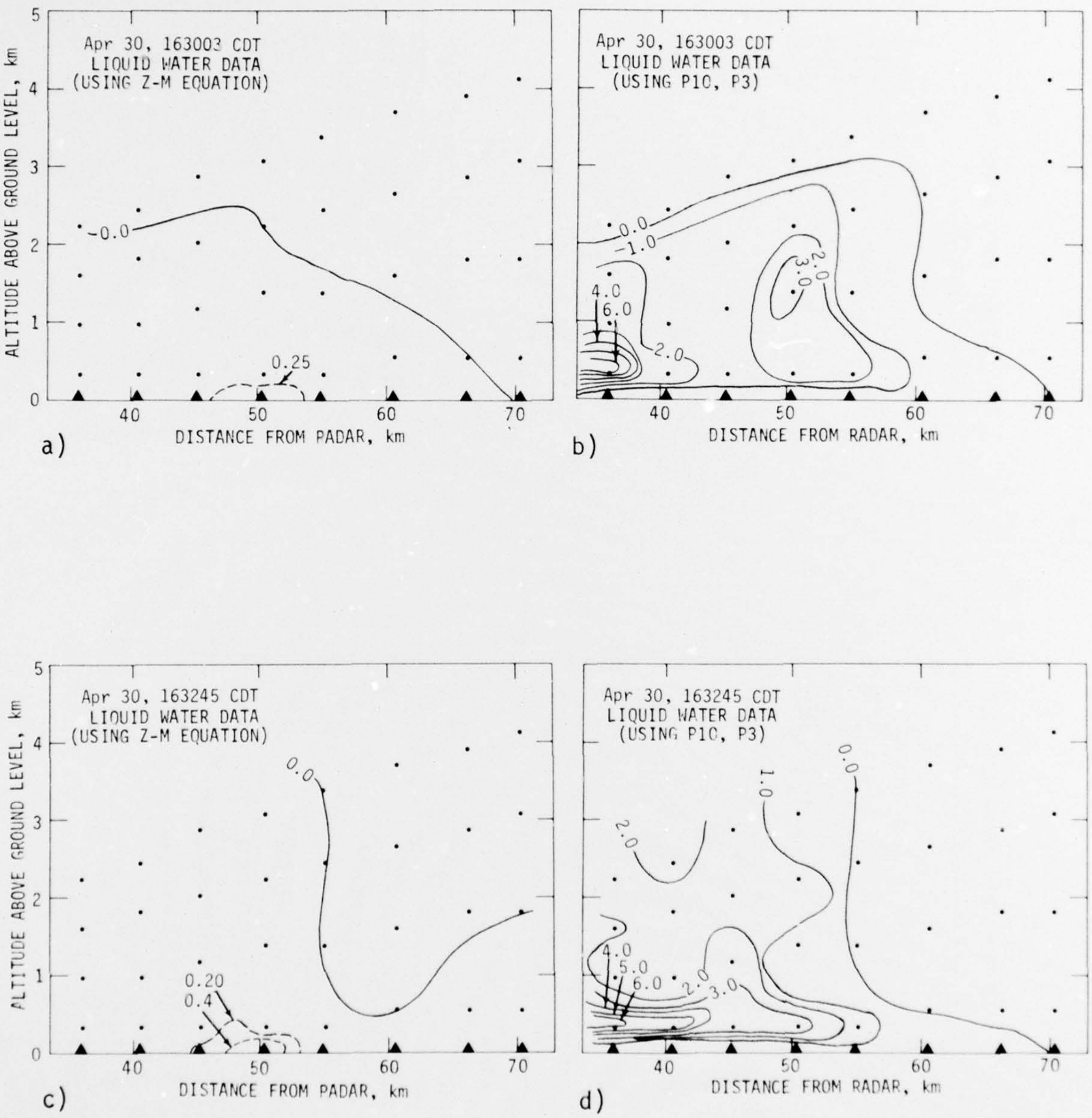


Figure 6. Same as Figure 1 for 1630:03 and 1632:45 CDT

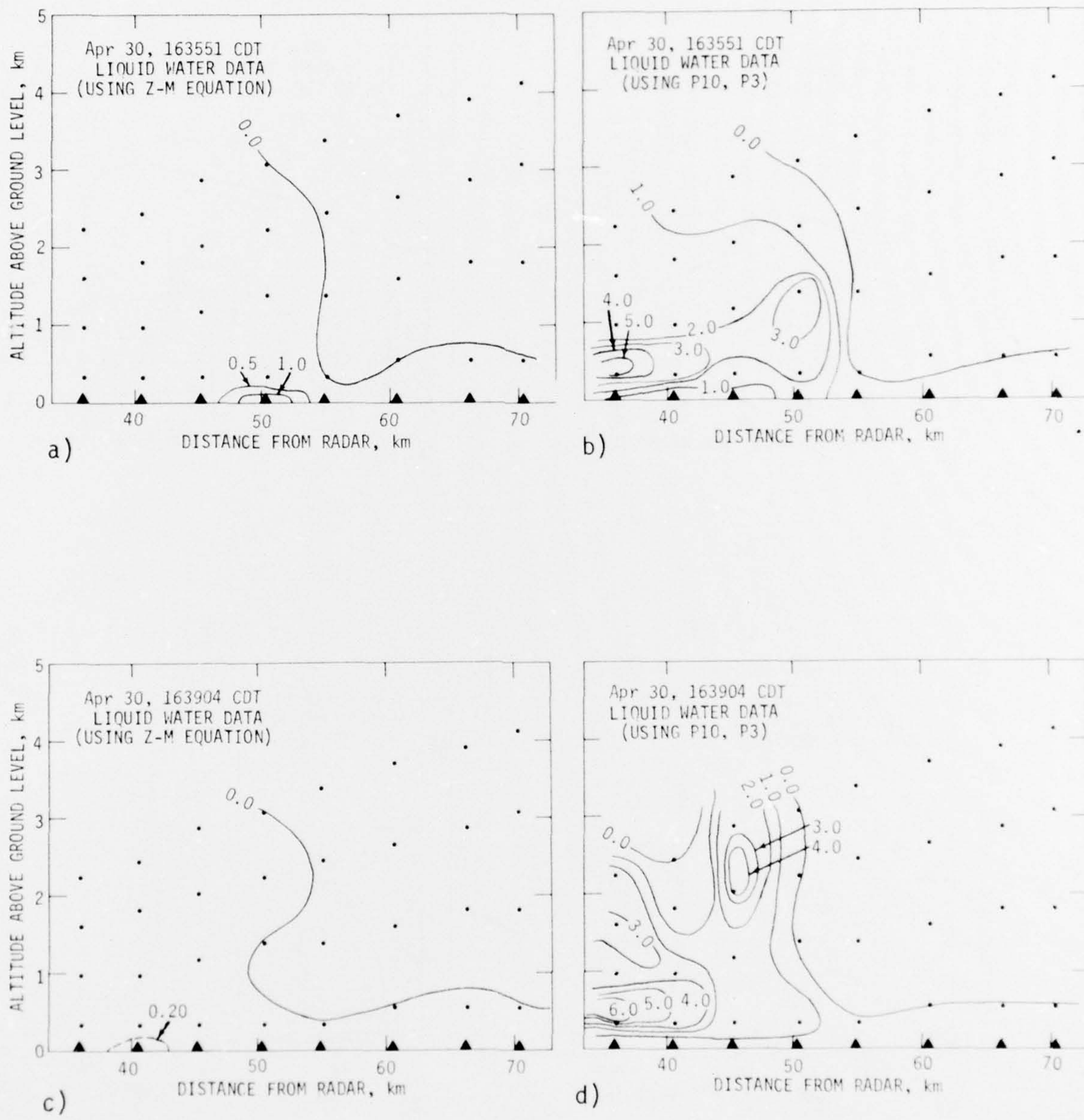


Figure 7. Same as Figure 1 for 1635:51 and 1639:04 CDT

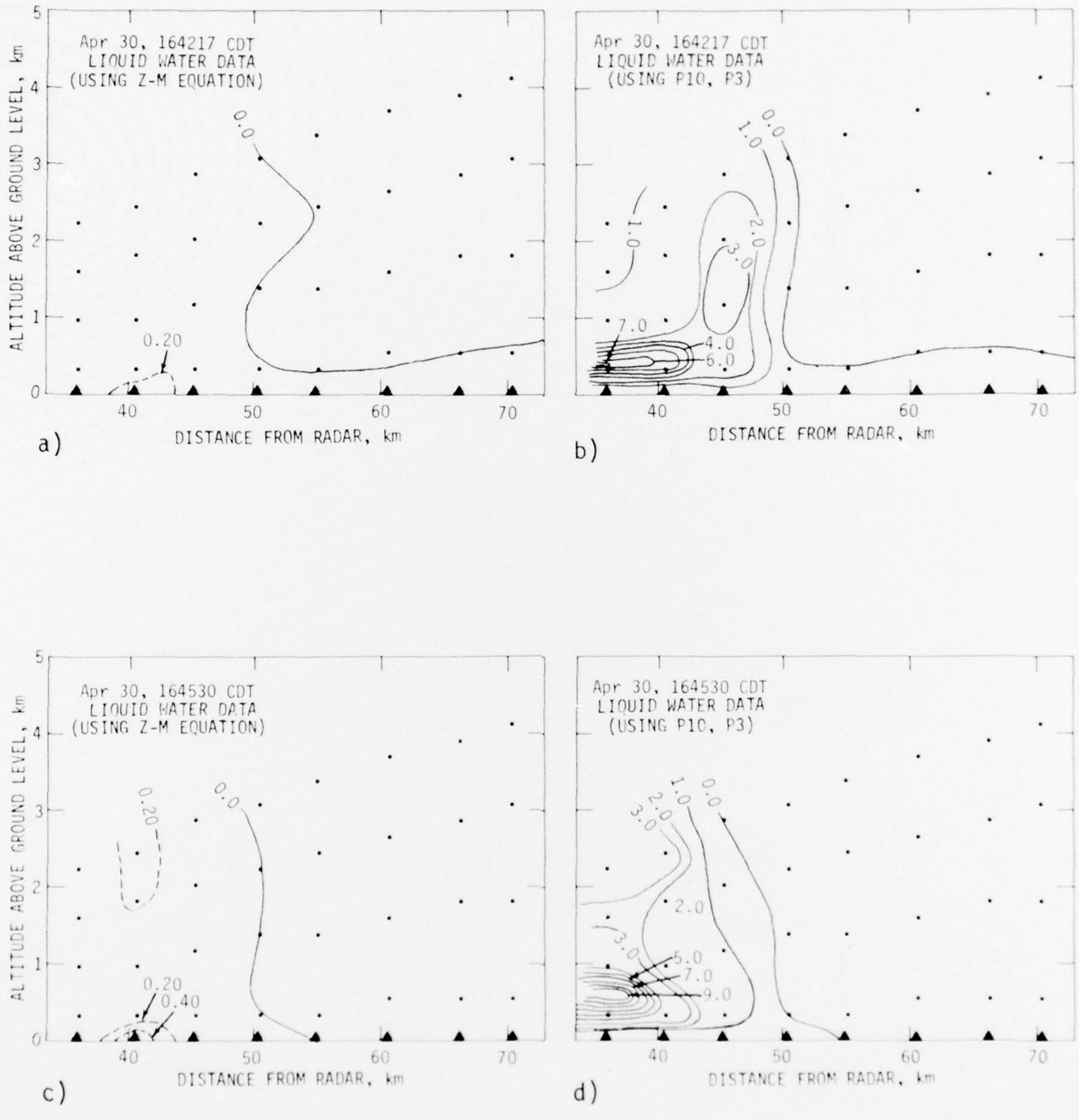


Figure 8. Same as Figure 1 for 1642:17 and 1645:30 CDT

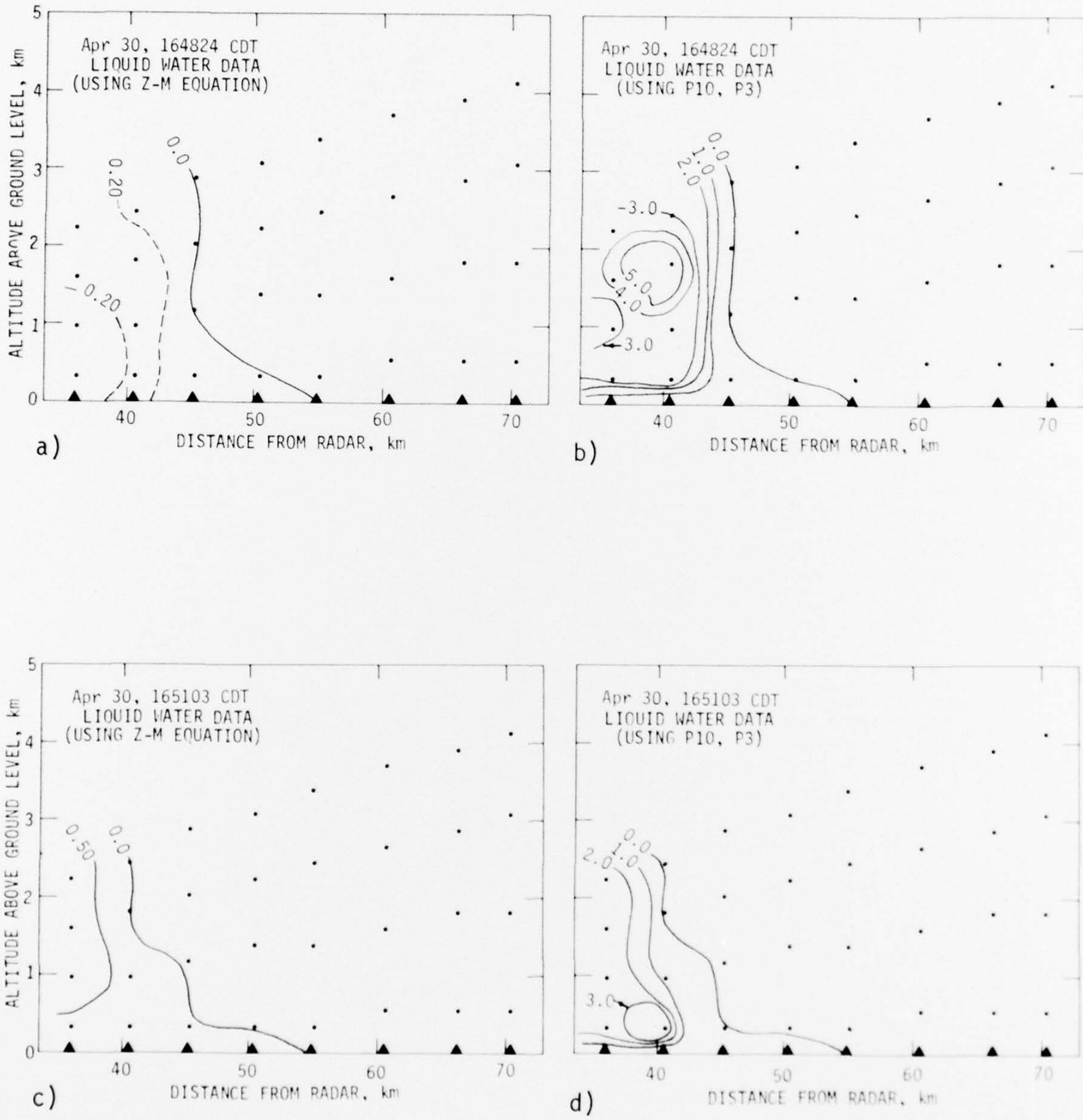


Figure 9. Same as Figure 1 for 1648:24 and 1651:03 CDT

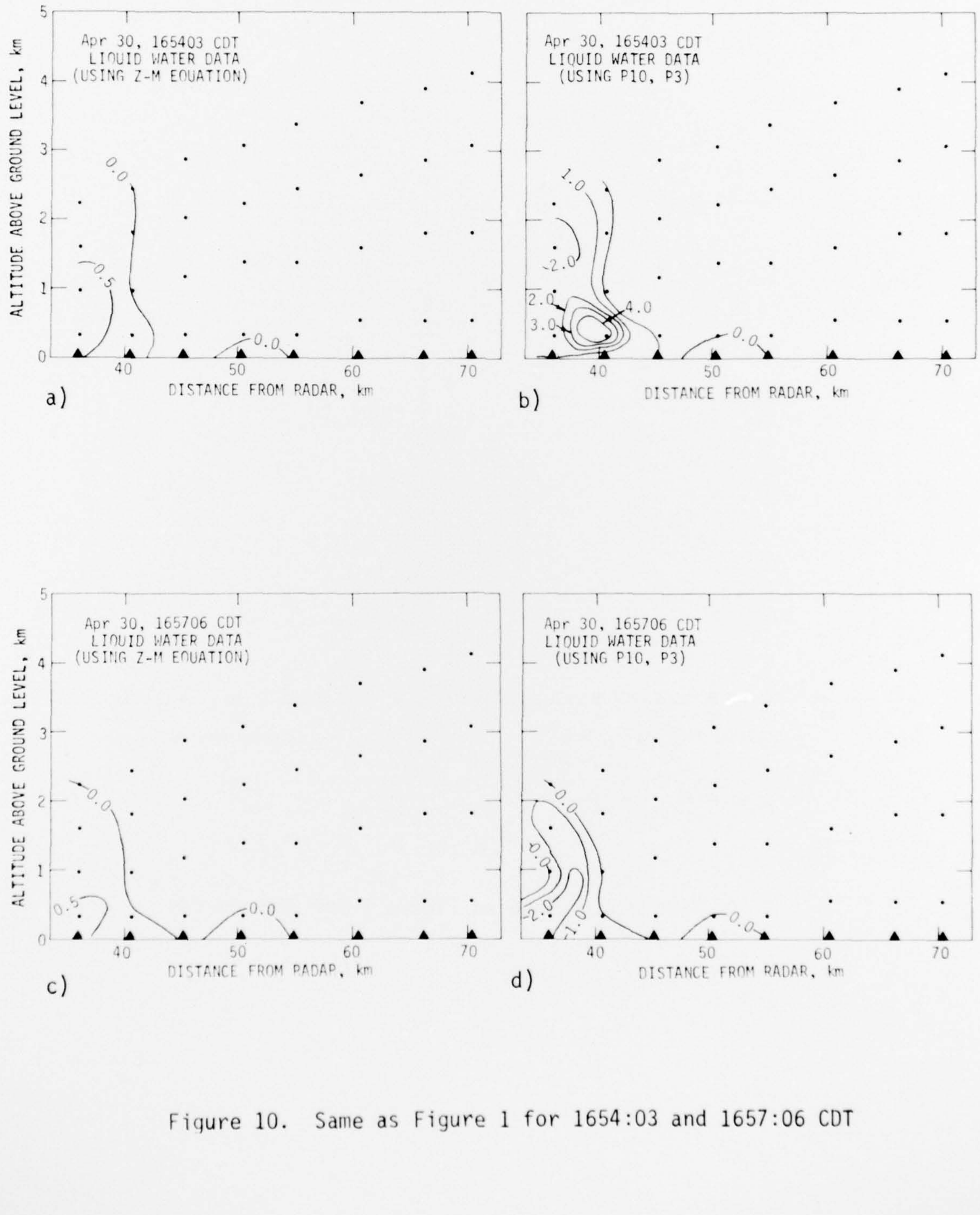


Figure 10. Same as Figure 1 for 1654:03 and 1657:06 CDT

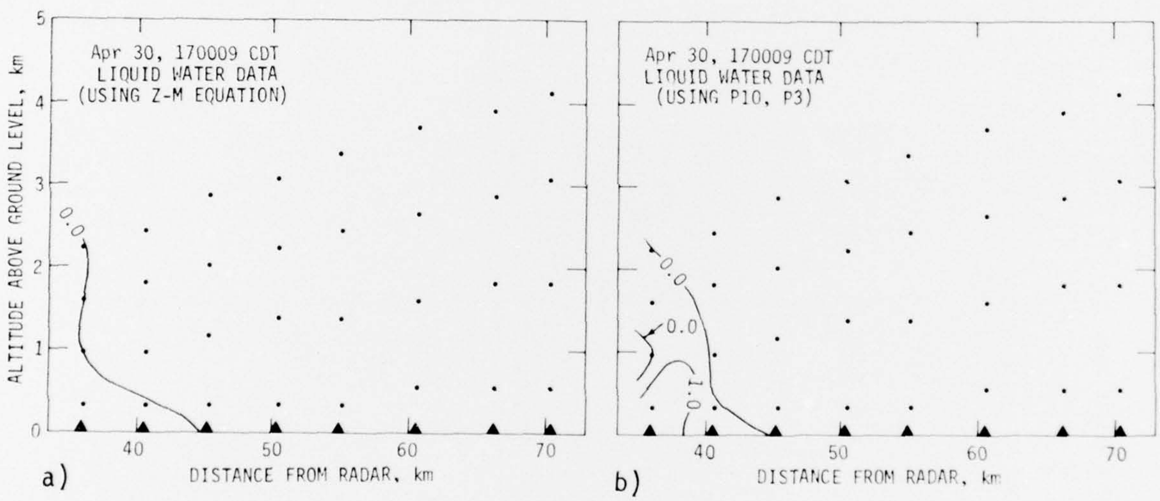


Figure 11. Same as Figure 1 for 1700:09 CDT